

DESIGN, THE VITAL INGREDIENT

by Michael Hunt



→ Doctor Michael Hunt

South Africa's fatal flaw is its lack of design, costing us R18 billion a year in licensing from more inventive countries.

We like to claim that we are a developing country, similar perhaps to some of those in the Pacific Rim area, yet we have failed to learn the simple lesson that these countries have grasped many decades ago that a nation must earn money by exporting products. South African industry has the wrong mindset for this type of scenario, and the basic problem cannot be solved without an all-round change in attitudes.

→ 1 is an illustration of the cause of our problem. It shows a three-dimensional diagram containing two activity graphs which read from left to right, one for a First World overseas environment where product designs originate, and in front of it the South African activity graph for comparison.

Overseas it is the flow path: 'Research-Design-Development-Production' which feeds those nations' manufacturing strengths. In South Africa, the attention given to new product design and development is conspicuously low in relationship to that given by First World countries.

Our manufacturing sector is supported almost entirely by the massive and expensive pipeline of overseas designs (many of them obsolescent), like a hospital patient on life support. As long as things stay this way, South Africa will never develop any competitive muscles and will remain an economic colony of the more enterprising overseas countries.

The South African car

If there is one specific industrial sector where major economic expansion and associated job creation is possible, it is the manufacturing sector. For this to happen we must see the world as our marketplace. To do this we have to be able to compete on world markets. In other words, the products must be better designed and produced than other products already on world markets.

The ability to compete on world markets depends heavily on a nation's culture of creative design. If we look at a similar sized country such as South Korea, for example, we find that there is a large design institute with a staff complement of around 600. The South African Design Institute has a complement of four or five tucked away in a corner of the South African Bureau of Standards (SABS). They do a great job with a small budget, but this stark contrast highlights the reason why there are many Korean cars on the roads of South Africa but there are no South African cars on the roads of Korea, or anywhere else in the world. If we think it is too costly to try and compete, we should remember the millions spent every year on fees for manufacture under licence. (For our manufacturing sector as a whole they were recently reported by an authoritative source to run to R18 billion annually).

The wealth generated by exporting manufactured products is heavily dependant on where the design is owned. For many products, the selling price is a function of the intellectual property it contains and may be many times the actual cost of manufacture.

Technology snake-oil

Our government has recently given a certain amount of attention to the subject of 'innovation' as a sub-heading to its promotion of 'Science and Technology'. This represents good progress toward developing the right attitude and should be welcomed. However, there is still a long way to go. The vital role of creative design has yet to be understood in the corridors of power in both government and industry. The word 'design' is hardly ever heard while the word 'technology' is bandied about so often that it has become a boring cliché.

Of greater danger is the belief that pure science itself is the magic formula for our salvation. Pure scientific research is important, but it does not make things happen. For that we need applied science and the other skills that go to make up a creative design culture.

Information provided by research can give the designer the information needed for creating new products. However, as has been clearly demonstrated in the Pacific Rim countries, research information can come from anywhere in the world. For example, those countries, using design, have achieved considerable economic growth based on imported R&D.

This type of information flow is indicated in → 1 (next page) by the dotted arrows labelled 'preferred flow'. A great deal of it is even freely available since many scientific researchers publish their work in papers at international conferences.

No need to be fancy

But what should we be designing? There are many products in which we are non-starters. For example jumbo jets and other massive or complex products need years of building up specialised experience and capital investment.

However, marketable products do not necessarily have to be high-tech. They just have to be a better product for the particular market. The world needs to buy products at all levels of sophistication, and we can take our pick of where we want to fit in.

It is also important that creative skills should be applied to the provision of products needed by the less advantaged sectors of our own community, especially those in the more remote parts of the country. We should also aim to do this in a way that increases the employment opportunities in those same parts of the country. In general such products are not available by importation or licence from overseas, most of them having not yet been designed.

Both 'productivity' and 'quality' have become popular slogans with people who highlight them as primary factors for ensuring competitiveness. It is true to say that they are both important in the production process. However, there are two indisputable facts concerning them:

- They are both dependent on the design of the product;
- No amount of attention to productivity or quality can make a competitive product out of an uncompetitive design.

If there is enough demand for a product, because of its competitive design, productivity inevitably rises to meet the demand. History has shown this time and time again.

Henry Ford's Model T is an excellent example of where a simple design success led to giant leaps in productivity and price reduction.

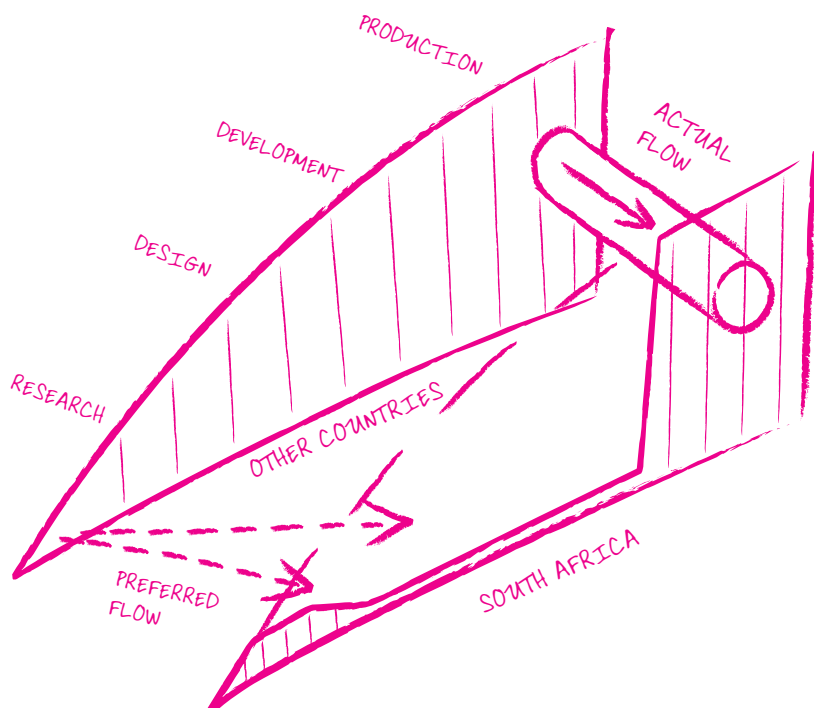
Picking up the baton

For those prepared to pick up the challenge, there is definitely a lot of work to be done. A few years ago, I, together with a like-minded colleague, founded the Masiphembe Project. Working with the Design Institute of the SABS, the Project has scheduled lectures and exhibitions on design, started an 'Innovators' Column' in a widely read local technical journal, established a CAD workstation in the library, and organised computer aided design training programmes for local schools and academies.

We have often heard it said that we should not sell our raw materials at their lowest value, but rather in some beneficiated form which would earn more money and provide more jobs. It is equally important to emphasise that we should not sell our human resources and manufacturing facilities at a low value, in the purely artisan role. We must put in the human effort of creative design so that South African brand names will successfully compete on world markets. The rewards to be gained from the added value and the massive demand for our products will be the driving force needed to bring about the continuing economic growth and employment opportunities which we need so desperately. 📍

Doctor Michael Hunt obtained his doctorate in mechanical engineering from the University of Pretoria for his research into high-duty composite materials. He was head of the team that designed the first and second stage rocket engines of the UK's successful 'Black Arrow' satellite launcher. Doctor Hunt was Chief Engineer at the African Explosives and Chemical Industries (AECI) and Chief Director of the National Mechanical Engineering Research Institute of the Council for Scientific and Industrial Research (CSIR), before starting his own design consultancy, MS Hunt Consultants, which has won multiple awards for design excellence, including being listed as a Technology Top 100 company.

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→ 1. Diagram showing the cause of the problem.