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# SUCCESSFUL PRODUCT DEVELOPMENT : A COMPARISON OF PRACTICES IN THE MALAYSIAN AND UK INDUSTRIES

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## ABSTRACT

*This paper describes an investigation into the new product development (NPD) practices of successful Small Medium Enterprises (SME) manufacturers and consultancies in Malaysia and the UK. The aim was to identify best practice in the NPD process for comparison across the two countries. The investigation focused on the factors: customers and marketing, product design and development, technical and management. A literature search derived a "model of existing best practice" found in larger companies. A comparison of the results indicated how best practice might be redefined in order to make them applicable to the Malaysian SME context.*

*Keywords: new product development, industrial design, best practice, small and medium industry*

## INTRODUCTION

The principal aim of the investigation described in this paper was to assist Malaysian SMEs to improve the management of their new product development (NPD) process through the creation of design recommendations.

The approach was to investigate best practice relating to product development in a selected number of Malaysian SMEs and compare them with a matched selection from the UK. The results of the comparison were then correlated with a model derived from recent literature concerning best practice NPD in larger companies. The UK was chosen for comparison because it is home to a significant number of SMEs noted for successful consumer product development. There is also a considerable body of literature that recognises the importance of design to business success and locates the responsibility for managing design at the highest level in successful UK based companies [see Allen (1993) and Cooper et al (1995)].

This paper concentrates on the outcome from the correlation of the cross-cultural comparative analysis of SMEs with the model of best practice derived from the literature review.

## RESEARCH METHODOLOGY

Case studies were conducted with three successful Malaysian SMEs and three from the UK, plus one successful design consultant from both countries. These identified the background, the development and the current conditions that led to the effectiveness of the process of new product development in the companies. The objective was to form detailed descriptions of best practice principles and elements from the product development process in both countries and to correlate these with best practices found in recent literature.

The data was collected through three inter-related stages:

1. Case study interviews<sup>1</sup> which involved semi-structured and open-ended questions to allow comparability in the subsequent analysis of the case material.
2. Reviews of documentary sources such as reports, newspaper cuttings, catalogues and brochures in order to get information about the companies and their products to supplement the interview data.

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<sup>1</sup> A multiple-case design approach Yin (1989) was chosen since it enabled comparative or cross-case analysis to be conducted between organisations, i.e., Malaysian SMEs with UK SMEs. The selection of respondents for the case study interviews was largely based on their experience of the process of NPD.

3. Direct observations' during visits to the case study 'site' and during the interviews with the respondents. This source of evidence was important since it provided additional and complementary information about the issues being investigated.

The case studies focussed on four important issues derived from the concept of Business Process Analysis (BPA) research, as suggested by Champy (1995). These issues are (1) purpose, (2) culture, (3) process and performance, and (4) people. The adoption of these issues was an important aspect of the novelty of the research; however, this is not the subject of discussion in this paper.

Case studies companies were selected based on notable, successful design projects and the general perception of their reputation for design leadership, particularly within the consumer durable product market sector. Companies and design consultants were considered 'successful' where they had demonstrated commercial success and had a high reputation for good product development. The selection was also based on other related recognition and awards given to companies and design consultants.

The sample was selected from three major areas of consumer durable products: domestic electrical appliances, office furniture and plastic products. Each product sector was chosen because it had been prioritised as a key area of growth for Malaysian SMEs, as identified in the Sixth Malaysian Plan (MIMOS 1996).

The data derived from the case studies were analysed by a simple cross-case analysis procedure suggested by Yin (1989 pg.57 & 115). This was categorised using key phrases and then compared and contrasted in order to discover whether there were any patterns or relationships between the two countries. In order to determine the main conclusions, the results were then correlated with a derived model of best practice (see Figure 1).

### **Derived Model of Best Practice in New Product Development**

The *model* was derived from a literature review, a large part of which was based on a description of NPD in multinational manufacturing companies concerning marketing and business management factors, with limited texts from the industrial design perspective. The review involved a broad-based study that generated insights into the rich complexity of the elements of best practice relevant to the aims of the research. It identified several factors for adoption into a *model* of best practice. These factors have also been identified as central to successful NPD in numerous other studies<sup>2</sup> These were considered to be the core factors for correlation to practices in both Malaysia and UK companies. They were:

1. Customer and Marketing Factors
2. Product Design and Development Factors
3. Technical Factors
4. Management Factors

### **Comparison of Malaysian and UK SME Case Studies Findings**

The findings from the comparison of Malaysian and UK case studies showed that both groups of SMEs have:

1. Excluded customers and end-users from the NPD process.
2. Employed industrial designers as 'aesthetic specialists' or 'visualisers' in order to 'give a uniqueness to the design' in the NPD process.
3. Not employed the services of industrial design consultants or external expertise.
4. Not adopted any particular design process model while carrying out design development.

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<sup>2</sup> [see Song and Parry 1997, Cooper 1996, Link 1987, Cooper and Kleinschmidt 1987, Maidique and Zirger 1984, Cooper 1983]. Moreover these key factors appear in all phases of the NPD process model i.e. Pre-Study, Ideation, Design and Development, Production and Marketing [e.g. see Fawcett 1990, Pahl and Beitz 1984, Corfield 1979, Edward 1977].

The differences between Malaysian and UK companies were:

1. That most Malaysian SMEs still rely on existing company products and foreign technology to develop new products while most of the UK companies innovate their own products according to their specific markets.
2. UK SMEs upgrade the quality of their products and introduce new product ranges based on market demands and customers trends. In Malaysia however, companies do not conduct market surveys since they claim to have sufficient business experience to determine customer requirements already.
3. Most UK companies in this study base their design and development on strategic planning which is set to target customers and markets, while in Malaysia this activity is still based on 'reverse engineering', 'modification' and 'localisation' to suit local needs. Similar findings have been made by previous studies e.g.: Awang (1995) and Er (1994)
4. UK companies in this study were less dependent on existing products and have continuous programmes of upgrading and replacing products in order to follow market demands and customer trends. By contrast, Malaysian companies' products are based on foreign sources such as catalogues, magazines, trade exhibitions and shows. Since these products are 'under license' and based on foreign design and technology, they are often outdated<sup>3</sup>.
5. There are major UK-Malaysia differences in quality certification. Whilst most UK companies have adopted a formal quality certification, in Malaysia most are still in the process of achieving this.
6. Finally, the findings showed that most UK companies have implemented Concurrent Engineering while Malaysian companies have not.

### **The Correlation of Malaysian and UK Case Studies Findings with the *Model of Best Practice***

The findings from the comparison were correlated with the derived model of best practice (Figure 1). This involved a correlation of 'actual' practice against the *model* of best practice guided by the four core factors and the specific requirements underlying them. The aim of this correlation was to identify patterns and relationships that might exist between the '*actual*' practice of Malaysian and UK companies with the *model*. It was hoped that this correlation would show how the elements of best practice might be redefined in order to make them applicable to the cultural context of Malaysian SMEs. The results below summarise the correlation in terms of the four core factors.

#### **1) Customer and Marketing Factors**

None of the elements of best practice concerning customer and marketing factors outlined by the proposed model match those outlined in the Malaysian study. In the latter, most of the products produced by Malaysian SMEs are based on existing products and foreign technology. 'Localisation' and 'modification' have been employed by Malaysian SMEs to produce low quality products with limited design choice. By contrast, part of the key aspects of best practice underlined in the model, state that the product should have unique features/benefits for users, be a first-to-the-market type of product and have a higher quality than competing products. The correlation showed that the elements of best practice in the UK study were similar to the elements underlined in *model*. For example, UK SMEs produce their own products for their own specific market, upgrade the quality and introduce new product ranges based on market demands and customers trends.

Despite these differences, both the Malaysian and UK studies showed that they have excluded customers and end-users from the NPD process. This element of practice clearly differs from the *model* that states companies *should* involve their customers from an early stage of design and development. According to the model, customer involvement is crucial since they can introduce information to help guide NPD. Thus, to develop products successfully, both the Malaysian and UK companies need to find a way to involve their

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<sup>3</sup> Idris Jusoh (BT 20th June 1996), Deputy Entrepreneur Minister of Malaysia, has indicated that most Malaysian SMEs are cost-driven and are wary of investing in new designs and thus produce lower quality products featuring outdated designs.

customers in the early stages of NPD. Without this involvement, companies may not be able to study customer feedback regarding products. Consequently an inability to adjust to specific markets and users' needs and wants may result.

## 2) Product Design and Development Factors

It was evident from the correlation that Malaysian SMEs are still far from UK SMEs and the *model* in terms of product design and development. For example, findings show that activity regarding design and development in Malaysian SMEs is still based on reverse engineering. Perhaps, some lesson may be drawn from the element of best practice outlined in the UK model, which is similar to the *model*. These include designing for high quality products, less dependence on existing products and the use of new technology in design and production.

The correlation showed that both UK and Malaysian SMEs detail R&D departments to assist in the development of new products. Special budgets are also allocated for R&D and this is a feature of the *model*.

The Malaysian and UK studies show that companies use industrial designers from the first stage (ideation) to the last stage (production). Also, that the main role of the industrial designer is as 'aesthetic specialists' and 'visualisers' to give uniqueness to the design in the process of NPD. Although these elements of best practice are outlined in the *model*, it is suggested that these roles are too narrow and should be wider. The *model* outlines the role of industrial designers as covering the elements discussed above but also acting as a mediator within the multi-discipline team, co-ordinating projects, cutting production and its costs and developing product strategy. In order for both, countries to succeed in developing new products in the future, the role of industrial design in NPD process should be reconsidered. This is because this research has shown that; successful companies see the role of industrial designers in NPD not as subordinate to engineers or marketers but rather as having 'multi-tasking' roles and skills in order to produce high quality consumer products to compete in markets. This paper proposes that the success of the role of industrial designers in NPD in Malaysia and the UK SMEs depends heavily on a culture based upon equity.

Most UK and Malaysian companies have not employed the services of design consultants to help them design new products and strengthen company strategy. This practice contradicts the *model*, which suggests that companies benefit from design consultant's advice. In order for both UK and Malaysian companies to maintain their position in the changing market, this element of best practice should be considered. Although industrial design consultant services are limited in Malaysia, this research proposes that by not nurturing these services, Malaysian SMEs may not realise any benefits industrial design consultancy provides<sup>4</sup>. UK SMEs, unlike Malaysia, do not have problems engaging design consultant services since the UK has one of the strongest consultancy industries in the world (Cooper et al 1995).

## 3) Technical Factors

Most UK and Malaysian SMEs have not adopted any particular design process models; instead they used a sequential process. This is in contrast to the *model*, which suggests that companies should have a proper model of their design process, with each function having input at all stages. However, in terms of quality systems, there were differences between the UK and Malaysian studies. Generally, most Malaysian SMEs have not yet adopted a formal system, whereas UK SMEs have adopted one for some time. UK results are similar to the *model*, which suggests that companies should adopt a quality standard in order to improve products.

In terms of Concurrent Engineering (CE), the results of the correlation show that most of the UK companies have implemented CE while the Malaysian companies have not. As suggested by the *model*, CE should also be implemented. As Pye (1993) reports some 43% of companies that have implemented CE achieve the benefits of lower costs, better quality and shorter cycle times.

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<sup>4</sup> Studies have shown that companies who employ the services of design consultants to help develop new products show 90% of implemented services are commercially successful (Roy 1987).

#### 4) Management Factors

There were significant differences between cases in terms of management style and the role of top management. The correlation showed that top management are responsible for all business policy, business culture formulation and processes in countries. In the study, the importance of management styles in successful NPD is highlighted by the *model* (see Figure 1). It suggests that management style should be flatter, less hierarchical and include flexibility leadership. As well as this, top management needs to commit itself to; promoting product champions, influencing NPD and be involved in the entire development process. Currently, in UK and Malaysian SMEs, traditional management practices remain. This is in stark contrast to the *model*.

Finally, there is a relationship between Malaysian and UK elements of best practice with the *model* regarding the role of the product development manager. The correlation shows that most product development managers in SMEs are responsible for the product design and development process and are responsible for their team as well as deciding on the final design of products proposed by the team.

#### Discussion of the Findings from Correlation Study

From the results of the correlation, several distinct features emerged which explain the patterns and relationships that exist between the 'actual' practices of Malaysian and UK companies with the *model* (see Figure 1). Based on this, it is believed that UK companies may perform better than Malaysian companies with regard to NPD. However, both UK and Malaysian companies *should* refer to the *model* in order to become more successful in a competitive market.

### RECOMMENDATIONS

The following recommendations of elements of best practice are possible guidelines for Malaysian SMEs in the improvement of their product development process.

#### 1) SMEs Products and Brand Names

The results of the study identified that Malaysian SMEs are still reliant on existing products and foreign technology to develop new products. As a result, most Malaysian SMEs have produced outdated and low quality products with a limited choice of design. Their success will greatly depend on their capability to design and produce products that can compete in both the local and global markets. It is therefore recommended that they produce their own products with their own design and brand name that aim to meet international standards.

#### 2) Model of Product Development Process

Such models are shown to be an effective and popular way of organising product development in the most successful companies, yet the results show that Malaysian SMEs have not adopted any particular design process model. It is suggested that they should determine and adopt a model of the product development process appropriate to their company.

#### 3) Concurrent Engineering

The findings confirmed that Malaysian SMEs have not implemented Concurrent Engineering but rather stick to the traditional "*throw it over the wall*" working practice. To help their departments work, in a more integrated manner, they should adopt CE methods.

#### 4) The Role of the Industrial Designer in the NPD Process

In Malaysian SMEs this role is mainly that of '*aesthetic specialists*' etc. This is too narrow a role and only covers part of the NPD process. The role of the industrial designer should be redefined so that designers can be effectively involved in the whole process, including manufacturing and marketing.

### 5) *Design Awareness*

The study revealed a lack of awareness of good design and the importance of design in daily life by Malaysian consumers. In order to elevate the level of design in Malaysia, it is necessary that design awareness be widely promoted by the Malaysian government through all types of media and not just through schools. There is a need to propagate design activities including innovation, design trends, consumer lifestyle and other related activities. New organisations also need to be set up to develop design awareness.

### 6) *Design Consultant Services*

Most Malaysian SMEs have not employed the services of industrial design consultants to help them design new products. It is suggested that they look at countries where companies employ industrial design consultant services to help them design new products.

### 7) *Consumer Requirements*

Most products made by Malaysian SMEs are not appropriate to market needs due to a lack of market research on consumer requirements. They need to base production on consumer and market requirements rather than trying to sell what they can produce. In order to achieve this, they should carry out adequate market research, develop products with a clearer market strategy and pay more attention to the customer. In addition, a 'Consumer Protection Body' could be established to protect consumers by assessing products in the market in terms of consumer requirements.

### 8) *Design Education*

Industrial designers in Malaysian SMEs are mostly skilled in creating new design concepts and initially lack knowledge of technical areas such as basic engineering, materials or processes. At present, Malaysian design education concentrates on 'aesthetics' and art based knowledge rather than industrial realities. Design education needs to incorporate more technical and engineering knowledge since much of industrial design is related to highly engineered product design work. Experts from different backgrounds should be involved to help bridge technology, marketing and design. Training for industrial and engineering designers in SMEs is also recommended as part of this revision of design education.

### 9) *Management Style*

Malaysian SMEs are very hierarchical. However, the research shows that by changing company organisational styles to flatter ones that include flexible leadership, enables middle management to function more effectively and promotes best practice in managing the NPD process.

## CONCLUSION

This paper describes research that has used case study methods to address design management issues concerning the improvement of the NPD process amongst Malaysian SMEs. The recommendations it has made are based on the standpoint of industrial design. It is hoped that they enable product development managers to see the advantages of adopting new strategies and working practices in order to achieve improvements in contemporary measures of performance, such as cost, quality, service and speed. As well as these important attributes, it is hoped that it helps them to consider elements of best practice that can create long-term competitive advantages to further their respective business effectiveness.

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**FIGURE 1: Derived Model of Best Practice**

**1. CUSTOMER AND MARKETING FACTORS      3. TECHNICAL FACTORS**

***Company's Products***

Unique features/benefits for users  
Highly innovative products, 'state of the art'  
Difficult for competitors to copy  
Superior products of higher quality than competitive products  
First-to-the-market type products  
Products should allow customers to reduce their costs

***Customer Expectations and Responses***

To meet user needs better than competing products  
To be accepted quickly by users  
Selection of customers for testing market acceptance  
Involvement of customers in the design and development process  
Development by teams which more fully understand user needs

***Marketing Knowledge and Proficiency***

Understanding of the target market  
Understanding of users' needs and wants  
Understanding of buyer's behaviour  
Development with a clear market strategy  
Knowledge of buyer price sensitivity  
Knowledge of the competitive situation  
Determination of market characteristics and trends  
Study of feedback from customers regarding their product  
Market research resources  
Strong sales force launch effort  
Strong advertising/promotion launch effort

**2. PRODUCT DESIGN AND DEVELOPMENT FACTORS**

***New Product Design***

Assessment of needs for new products  
Translation of the product concept into business terms  
Interaction with users in the development stage  
Less dependency on existing products in the market  
Close relationship to the company's areas of expertise  
Industrial design to play a major role in product design  
Use of new or advanced technology in design and production  
Production of innovative and superior products  
Global market centred design

***Model of Process should incorporate:***

A clearly defined process  
A proper model of the design process  
Standards by adopting quality standards i.e. BS, ISO, TQM etc.  
A process widely understood and accepted throughout the company.  
Each function having an input at all stages of the process

***Multi-Disciplinary Teamwork elements include:***

A high degree of integration between team members  
Recognition of the importance of design/industrial design  
Awareness of the role of industrial designers  
Understanding of goals by all team members  
Open and free communication  
Mutual trust and assistance between members in the team  
Understanding and recognition of other members tasks  
Joint decision making

***Concerns for Concurrent Engineering are:***

Implementation  
Reduce product development and production times  
Performance efficiency  
Interaction between inter-disciplinary teams  
Relative importance and role of all members  
Design, development and production changes to be kept to a minimum  
Advantages to the company

**4. MANAGEMENT FACTORS**

***Management Style***

Flatter, less hierarchical structures  
Flexibility leadership  
Improved internal communication

***Top Management***

Commitment to product champions  
Influence in new product development  
Less individual power and directed authority  
Involvement in the entire development process  
Support by senior management

***Role of Product Development Manager***

Informed and committed in leadership  
Direct and frequent communication between all

***Research and Development***

Existence of own, centralised R&D department  
Specific budget/allocation for R&D  
Support by all levels of management

***Role of Industrial Designers is to:***

Visualise and create the product concept  
Represent alternative design solutions  
Act as mediator within the multi-discipline team  
Co-ordinate projects  
Improve the quality of products  
Cut product and production costs  
Making products easier to use  
Develop product strategy  
Package and publicise the products

***Design Consultants and External Expertise***

Employ service of industrial design to provide advice  
and contribute to design proposals  
Appoint external expertise to advise the company

levels

Create a clear strategic direction  
Assign responsibilities to team members  
Establish directions for team development  
Make major decisions for the team  
Set objectives for team tasks and development