Design and market position - mapping the market with the MADRID market map

Conference or Workshop Item

DESIGN AND MARKET POSITION – MAPPING THE MARKET WITH THE MADRID MARKET MAP

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ABSTRACT

This paper reports on some of the significant findings of the MADRID project – 'Market Demands that Reward Investment in Design'. The origin of the project was as a follow up, and development of, the earlier CID – 'Commercial Impacts of Design' study (Roy & Potter, 1993). CID was undertaken by the Design Innovation Group, from 1987-90, as a study of over 220 design and product development projects in small and medium-sized UK manufacturers. It provided, for the first time, quantified information on the commercial returns upon investing in professional design expertise at the product level. The MADRID project builds upon this work and sought to identify:

(a) Which types of market(s) are most likely to produce the best commercial returns from investments in design and product development?
(b) The most effective contribution of design in different market types.
(c) The long-term commercial benefits of investment in design and product development.

This paper presents the results of a re-analysis of data from the earlier CID study in order to address the first of the above aims. The results for the second aim were reported in Roy & Riedel (1997) and the third aim in Roy et. al. (1998).

Different approaches for market mapping were reviewed in order to develop a suitable technique for analysing the relationship between the market position of a company's product and its commercial performance. This led to the development of a new type of 'market map' for classifying product markets according to dimensions of quality and price sensitivity versus volume of production. This MADRID market map enabled products involving different inputs of design (product, graphics, engineering, industrial design) and with different degrees of financial performance to be compared according to the type of market at which they were aimed. Some 64 products were successfully plotted on the MADRID market map.

The analysis of commercial performance showed that there are successful products aimed at all types of market. Nevertheless, there were two noticeable clusters of commercially successful products – aimed at mid-quality, niche markets (QN) and at mid-quality, volume markets (QV). Some products in the price-sensitive volume (PV) market were also successful, where companies attempted to gain a competitive edge through adding value/ quality, whilst reducing the price-sensitivity of their products. However, the price-sensitive, niche (PN) market can be a problematic one in which to position a product. It appears difficult to perform well in it.

In conclusion design was used by companies either to move products into more profitable quality-sensitive markets or, in the case of some high-quality niche market products, to reduce costs and thereby increase sales volume. None of the companies

attempted to move their product down-market (bar the exceptions of high product quality companies trying to capture larger sales volumes). Likewise, none crossed from quality-sensitive to price-sensitive markets.

INTRODUCTION

> 'Another vital form of support for design is sound, meaningful research, for example on the business background in which design operates, the hows and whys of better design practice – and the effectiveness of its use'
>
> (Carl Gardner, Editor *Design* magazine, 1995)

The research project entitled 'MArket Demands that Reward Investment in Design' (MADRID) was designed to answer some of the pressing questions posed by Gardner. The project formed part of the UK Design Council's first Co-Partnership Programme on 'Design Effectiveness' and focused upon the research theme: 'When do Markets Reward Investment in Design'. This research theme was concerned with whether the returns on investment in design, and business attitudes to design investment, differ according to the market segments in which a firm is operating.

More generally, it was intended that the results of the project would contribute to the aim of improving UK competitiveness through better use of design – for example, by helping to change attitudes of business and finance towards the value of sustained investment in design and product development; and by enabling managers in UK firms to target their design resources at specific types of product and market to achieve commercial aims, increase exports and compete with imports; and by providing tools to facilitate effective design and product development policy-making by business and government.

The research project had three phases. This paper reports on some of the results from MADRID phase one. This phase of the project aimed to identify:

- which types of market(s) are most likely to produce the best commercial returns from investments in design and product development by UK firms;
- The most effective contribution of design in different market types (e.g. adding value; reducing cost; product differentiation).

This paper addresses the first of the above aims and is concerned with an investigation into the means of mapping the market in which a product is positioned and relating that to the commercial performance of the product design. The paper presents results and conclusions from mapping a sample of new and redesigned products.

The results were based on a further analysis of the existing data collected during the 'Commercial Impacts of Design' (CID) study carried out by the Design Innovation Group, in co-operation with the Design Council, from 1987 to 1990. CID was a study of over 220 design and product development projects in small and medium-sized UK manufacturers which had received government support for design. CID provided, for the first time, quantified information on the commercial returns upon investing in professional design expertise at the product level. (see Potter et al, 1991; Potter and Roy, 1991; Roy and Potter, 1993; Roy, 1994; Roy and Potter, 1994; Bruce, Potter and Roy, 1995).

The paper has the following sections:

- a review of the existing techniques for mapping products in the market;
- a presentation of the (MADRID) market map developed by the project;

- the method of market mapping used to analyse the existing CID data;
- the results of the market mapping exercise, including mapping of commercial performance and conclusions.

METHODS FOR MAPPING MARKET POSITION

Jenkins & McDonald (1994) make two important points in their paper on market segmentation:

1. 'There is a lack of empirical research which attempts to understand how organisations actually arrive at and sustain particular market segments.
2. There are no established frameworks for understanding the differing ways in which organisations may divide up and respond to their market place.'

This lack of established frameworks means that a given market segmentation scheme cannot be picked up 'ready made' and applied to the existing data from the CID study. Therefore, a framework must be derived from a review of those that are present in the literature and modified for the needs of the research project. The criteria that this framework must fulfil were that it must be able to map, or position, a product within a market, it must allow comparisons between products in different markets and between products in the same market.

In the next section of this paper, a new framework for mapping the market in which a company is operating (the MADRID market map) will be put forward. The product markets for over 60 design projects will be plotted on this map, based on data from companies in the CID study. It is hoped that this combination of conceptual framework and empirical data will help analyse the relationships between design and the market – and in particular which markets reward investment in design – as well as contribute to the development of design and marketing research and practice.

First, the existing mapping techniques in the literature will be reviewed. Ten techniques for mapping the market were found: Boston Consultancy Group product portfolio map, the directional policy matrix, the market evolution matrix, the perceptual market map, the Porter map, the quality–price map, the quality–volume map, the price–non-price map, the polar market map and the polar profile map. These are reviewed in turn below.

Boston Consultancy Group Product Portfolio Map

This map was derived from the work of the Boston Consulting Group which showed that a high market share led to high profitability and that resources should be shifted to products in growing markets (Brown, 1993). It has two dimensions – market growth rate and market share – producing a four quadrant map. However, the CID data does not contain sufficiently detailed information about a product's market share or market growth. The Boston map cannot, therefore, be used for Phase One of the MADRID project.

The Directional Policy Matrix

This was developed in response to criticisms of the Boston product portfolio matrix. It included other factors than just market share and growth into the analysis. These factors map the assessment of the overall attractiveness of the market and the company's ability to compete in that market relative to its competitors (Brown 1993, Chaston 1990). It maps market attractiveness against relative competitive strength – using a nine cell matrix. Again the problem with this map was the lack of sufficiently detailed data in the CID database to enable it to be used.

The Market Evolution Matrix

This map attempts to compare a product's position on its life cycle (introduction, growth, maturity, decline) with the company's relative competitive strength. Once again this map requires data which was not contained in the CID database and is thus unsuitable.

The Market Perceptual Map

This can be used to map key user groupings and competitors (Croft 1994, Reeder et al 1991). The drawback of this map is that it is too specific to a single set of user needs and thus market (eg. the holiday market). It cannot be used to map more than one market, or different markets, or products in them, on the one map. The required map has to be more general than this.

The Porter Market Map

This map (Figure 1) was derived from the work of Porter (1980). It has two dimensions: the vertical dimension represents differentiation and the horizontal can be either cost leadership or market coverage. Once again there was insufficient CID data to position products on these two dimensions.

The Price – Non-Price Factors Market Map

This map plots price against non-price factors (Figure 2). It was developed by Gardiner to map the changes in the UK market for portable power tools (Gardiner, 1995). It maps a product, or a range of products, on the basis of their absolute price and a qualitative estimate of their non-price attributes. It thus enables one company's product or product range to be compared against its competitors'. It also enables gaps in the product offerings of companies in the market to be identified.

The Quality – Price Market Map

This map, which is essentially a simplified version of the price/non-price factors market map, plots quality against price (Figure 3). There was sufficient data in the CID database to plot products using this map. Using this map a firm's product was plotted – using a qualitative estimate of the degree of price sensitivity of the market the product is aimed at, and using a qualitative estimate of the degree to which the market of the product is sensitive to quality attributes (such as performance, style, reliability, ease of use, etc.)

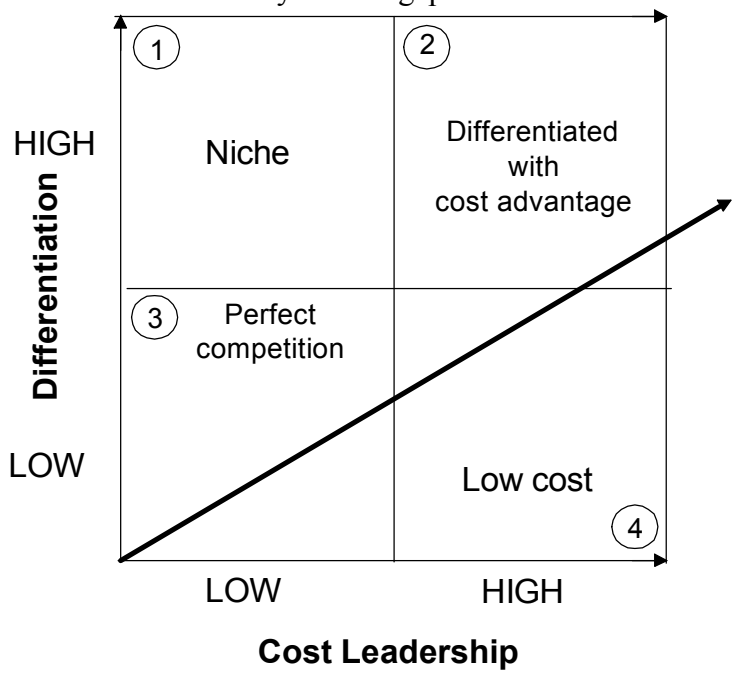
The Quality – Volume Market Map

This map plots quality against volume. It was developed by the research team as an alternative mapping to the quality-price map. Again there was data to plot products from the CID database. A similar qualitative estimate of a company's product's position is used, except price is replaced with volume. Volume is a qualitative estimate of the numbers of products produced, thus high volume products are aimed at the mass market, while low volume products are aimed at a niche market.

Alternative Polar/ Star Market Maps

It is possible to map all three basic dimensions discussed above (price, quality, and volume) on one map using a polar (or star) map. This would produce a three-dimensional map; each product would be represented as a vector composed of these three components (Figure 4). This produced a map which would be hard to interpret visually, particularly when a large number of products are plotted. Another approach is a two dimensional polar profile map (Figure 5). This map could also be extended to incorporate other dimensions to be considered in analysing product positions, such as that shown in Figure 6. This map would be useful for analysing one or two product

maps, but would become cumbersome with large numbers of products. Thus polar maps were discounted as useful analytical tools. Such maps could, however, prove valuable as a way of facilitating discussions with company product and marketing managers about the design of their products, or ranges, to satisfy different types of market. They are similar to the 'gap-web' analysis tools widely used by some companies and consultants to identify market gaps.



Source: Baker, 1994.

Figure 1: The 'Porter' Market Map

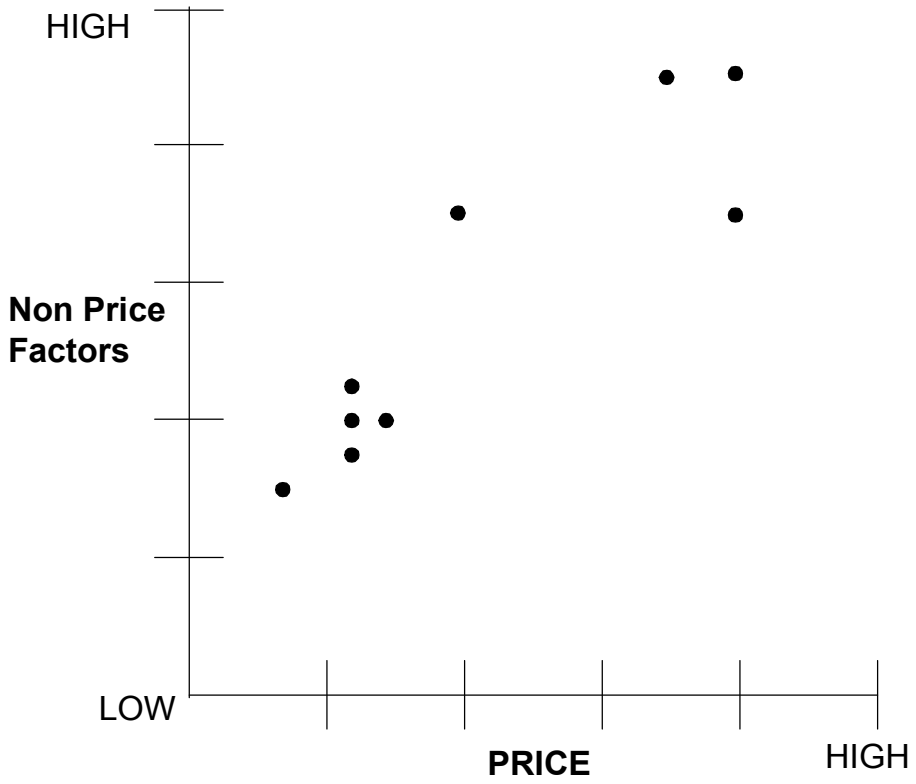


Figure 2: The Price – Non-Price Factors Market Map

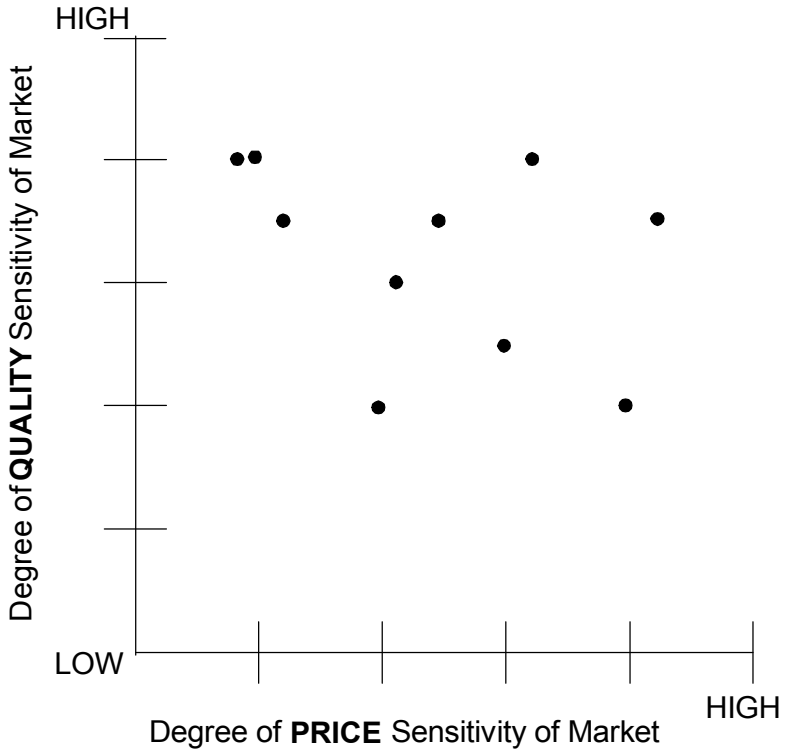


Figure 3: The Quality – Price Market Map

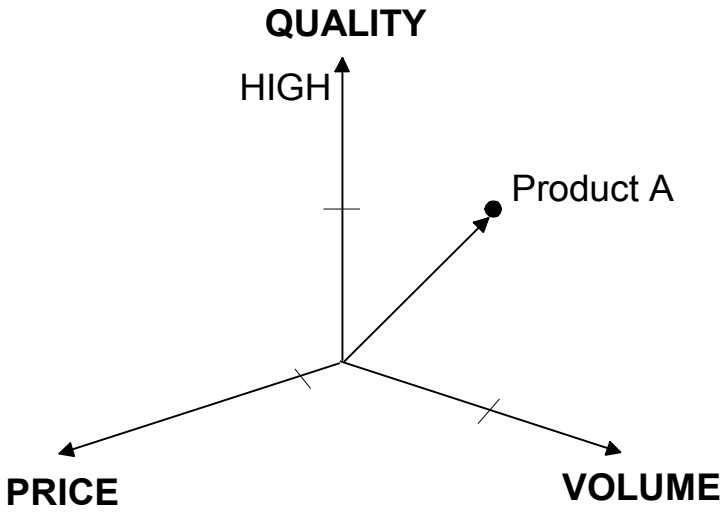


Figure 4: Polar Market Map

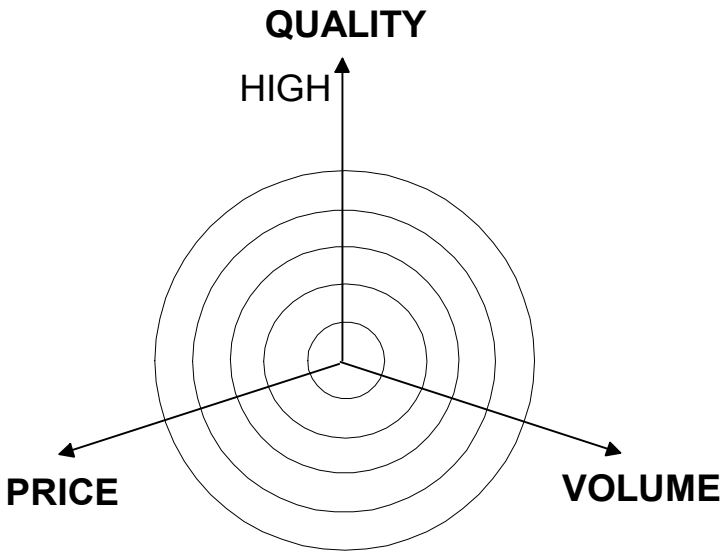


Figure 5: Polar Profile Market Map

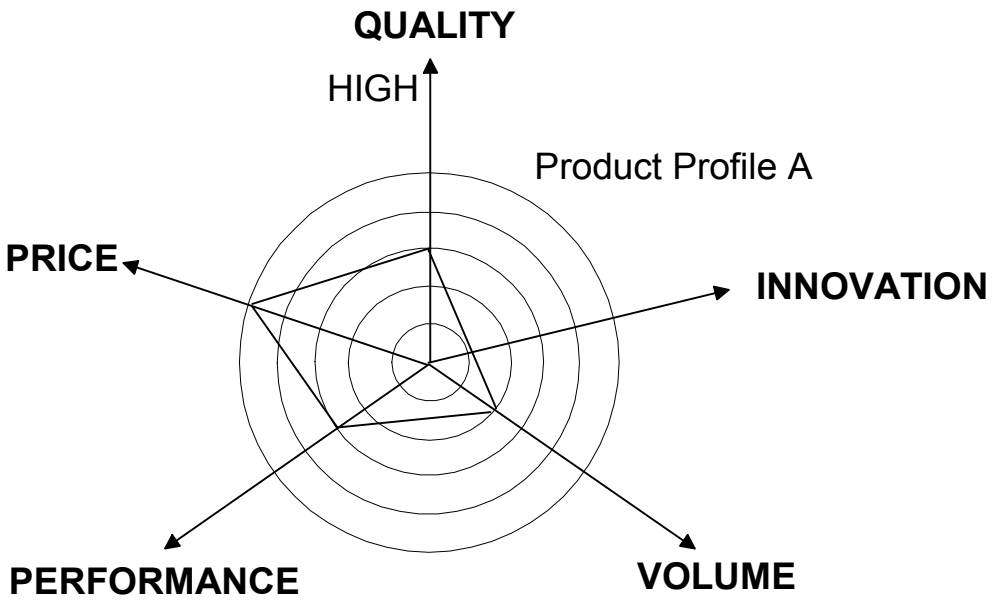


Figure 6: Multidimensional Polar Profile Market Map

THE MADRID MARKET MAP

From the above review of the various techniques for mapping the nature of the market within which a company places its products, it was deduced that the sensitivity of the market to both price and product quality needed to be mapped. It would also be extremely useful to measure volume (quantity sold). This is because, although it is often assumed that price-sensitive markets are mass ones, some niche markets can also be highly price-sensitive, and we, therefore, need to distinguish between these two different situations. The Porter map assumes that the cost leadership and market coverage dimensions are equivalent – viz. that high market coverage (high volume) also has high cost leadership (ie that high volume products are low cost). It cannot distinguish between a niche market that may be sensitive to price (ie demands relatively low-priced products) or a mass market which is price-insensitive (ie accepts relatively high-priced products).

The MADRID market map was developed:

1) To overcome the limitations of the Boston Consulting, Perceptual, Porter, Quality–Price, Quality–Volume, Price–Non-Price (Gardiner) maps and Polar maps.
2) To allow the mapping of markets (not just products).
3) To show, and allow, the analysis of movements between market segments (repositioning), particularly the movement from price-sensitive to quality-sensitive markets. This latter ability to map market repositioning of products is particularly important in determining the role of design in effecting the strategic change.
4) To allow the inclusion of commercial performance data for each product to be included on the map as well as its market position.
5) To maintain simplicity of presentation, which could be understood easily by both academics and practitioners.

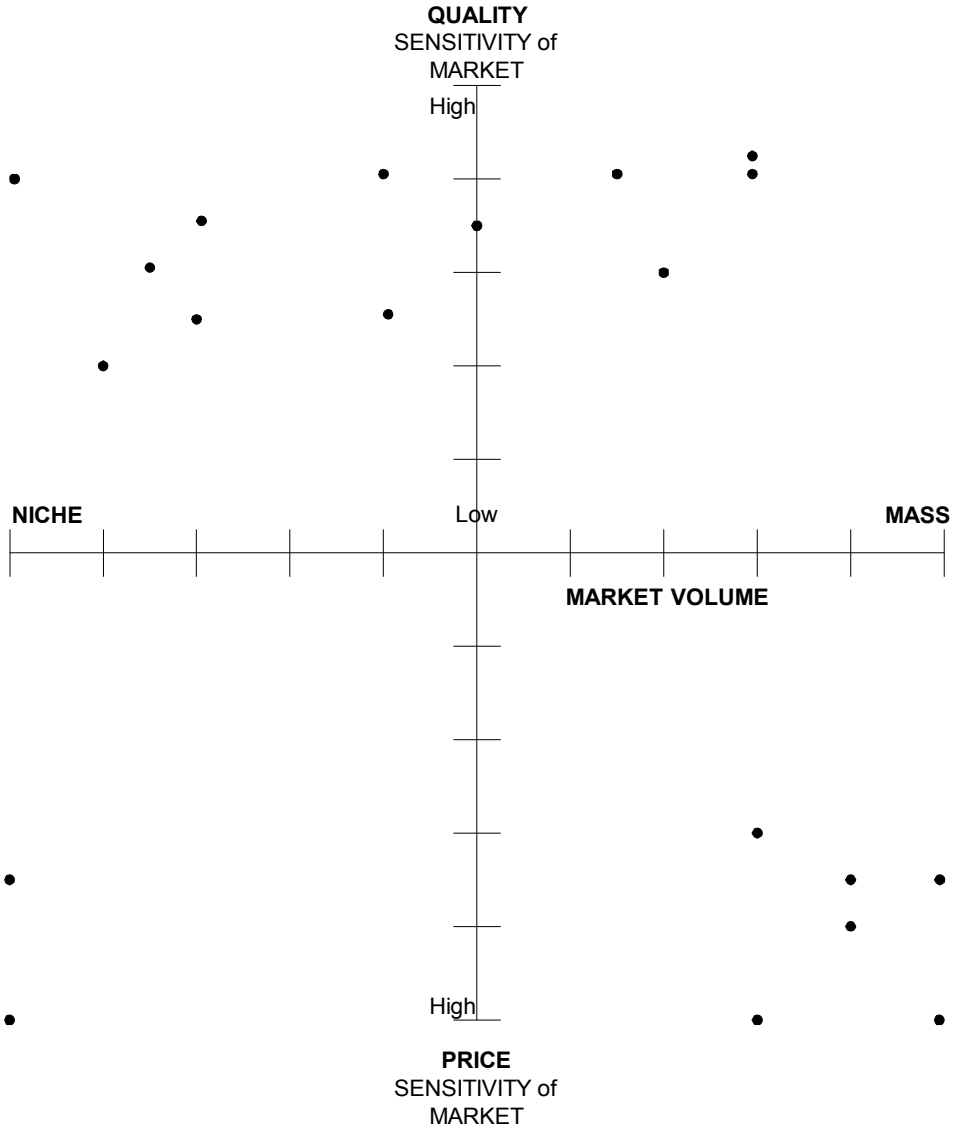


Figure 7: The MADRID Market Map

The MADRID market map, Figure 7, has two dimensions. The vertical axis measures the degree to which a product market is sensitive to the price and quality of the product. The horizontal axis measures volume, the extent to which a product is aimed at a mass or niche market. The two dimensions of the market map allow the mapping of market segments within which products are placed. It is a market map and not a product map (unlike the Price/Non-price map of Gardiner, 1995). It can, therefore, be used to study the difference in performance between market segments, the performance of products within segments, and the difference in performance when repositioning in the market (either changing market segments – i.e. repositioning to other quadrants – or repositioning within segments).

In positioning products or design projects on the vertical axis the criterion is whether companies sell their product mainly on price or on quality. Quality represents a bundle of attributes, such as performance, style, reliability, materials, finish, ease of use, etc. appropriate to the particular product. A map position thus represents the combination of price and quality, as companies rarely go for the extremes of either price or quality. It is not a mapping of absolute price (the price of the product), rather

it is a relative indicator of the importance of price in that market segment with respect to other market segments. Of course, some companies may go for a low price/ high quality strategy, in which case we need to identify if price or quality is the key factor. Alternative mappings (e.g. the Quality-Price map given above) may be useful for this.

The horizontal dimension – niche/ volume – measures the size of the market at which a product is aimed. Thus, volume products are assumed to always sell more units than niche products. So a score of -5 on the 'niche' side of the volume axis is a low volume product within its niche market, whereas near zero is a high volume product in its niche market. In the case of the niche side of the volume axis the position also indicates the degree to which the market that the product is operating in is specialised. The more specialised the market, eg. professional special purpose hand tools (torque wrench) as opposed to simple non-specialised hand tools (spanner), the more it is 'niche'. Thus, a niche market can be quite large, but it cannot be considered a mass market product. For instance both a Rolls Royce and the hand-built Morgan car are niche products, but the former is a relatively higher volume product than the latter - however, Rolls Royces are luxury cars and not mass market products. The volume, or mass, side of the volume axis indicates the size of the market that the product is operating in, thus high scores are given to mass markets, eg. supermarket foods. The position of a product on this axis is often determined by finding out in which outlets the product is sold – specialist shops, mail order, retail chains, or warehouses.

The above exercise has shown that product markets can be mapped onto a market map and useful analyses carried out. The aim has been to develop a useful tool, which both simplifies a complex situation and allows analyses to be performed. It can then be used to analyse the relationship between market position, the role of design (particularly in market re-positioning) and the commercial performance of a design or product development project.

Any process of diagramming, mapping or modelling of course represents a simplification of a highly complex situation, whether the MADRID Market Map has gone too far is for others to comment upon. The mapping of the CID products on it will enable the empirical validity and reliability of the market map to be tested. Having established the theoretical validity of the market map the method by which the companies' products were mapped is discussed next.

MADRID MARKET MAPPING METHOD

In interpreting the following maps it is important to remember that the position of a product on the MADRID market map was based on a qualitative judgement of its position. This was derived from a group discussion between the research project team (the authors) of the information in the existing CID study database and not from any new data obtained from the company. In positioning a product/ project on the map each would be examined in turn – using the CID data, in particular the interview summaries, the original face-to-face questionnaires and product brochures of the company. Although the CID database does not include specific detailed questions about the product's market, a number of survey questions contained relevant information. Factors taken into account in positioning products were the description of the product, nature of the market the firm said it was selling to (eg. retail, government, wholesale etc), the main customers, the main competitors, the business aims of the design project, what the firm said gave the product a competitive edge (price, quality, delivery, function, etc.) and other relevant comments of the respondents made on the questionnaire. In addition the personal knowledge of the

firms and their products of two of the researchers involved in the original CID study was made use of. This produced a map position for each product representing it as an individual and, as such, it does not necessarily accurately represent its position relative to other products.

RESULTS OF MADRID MARKET MAPPING

The process of developing and then analysing the product maps was carried out in stages. First, a feasibility study to test the method of positioning products on the market map was undertaken using a few products/ projects from the CID study. Then the remaining products for which the CID study database contained good market data were mapped (this included most of the companies interviewed, but excluded all of the postal survey firms).

Second, commercial performance information was mapped. This was in the shape of qualitative measures (project implementation and the firms' judgements of the project's commercial success) and quantitative measures (the time taken for the design project to payback its total investment and the gross profit margin achieved). This enabled a visual analysis of the resulting performance maps to be carried out. (The commercial performance measures are discussed below.)

Third and finally, the other factors of interest were analysed. These included the type of design expertise input during the project, the role of design and management attitudes. Again these were analysed in combination with the commercial performance information. The results from these analyses were presented in a separate paper *Design and Innovation in Successful Product Competition* (Roy & Riedel, 1997).

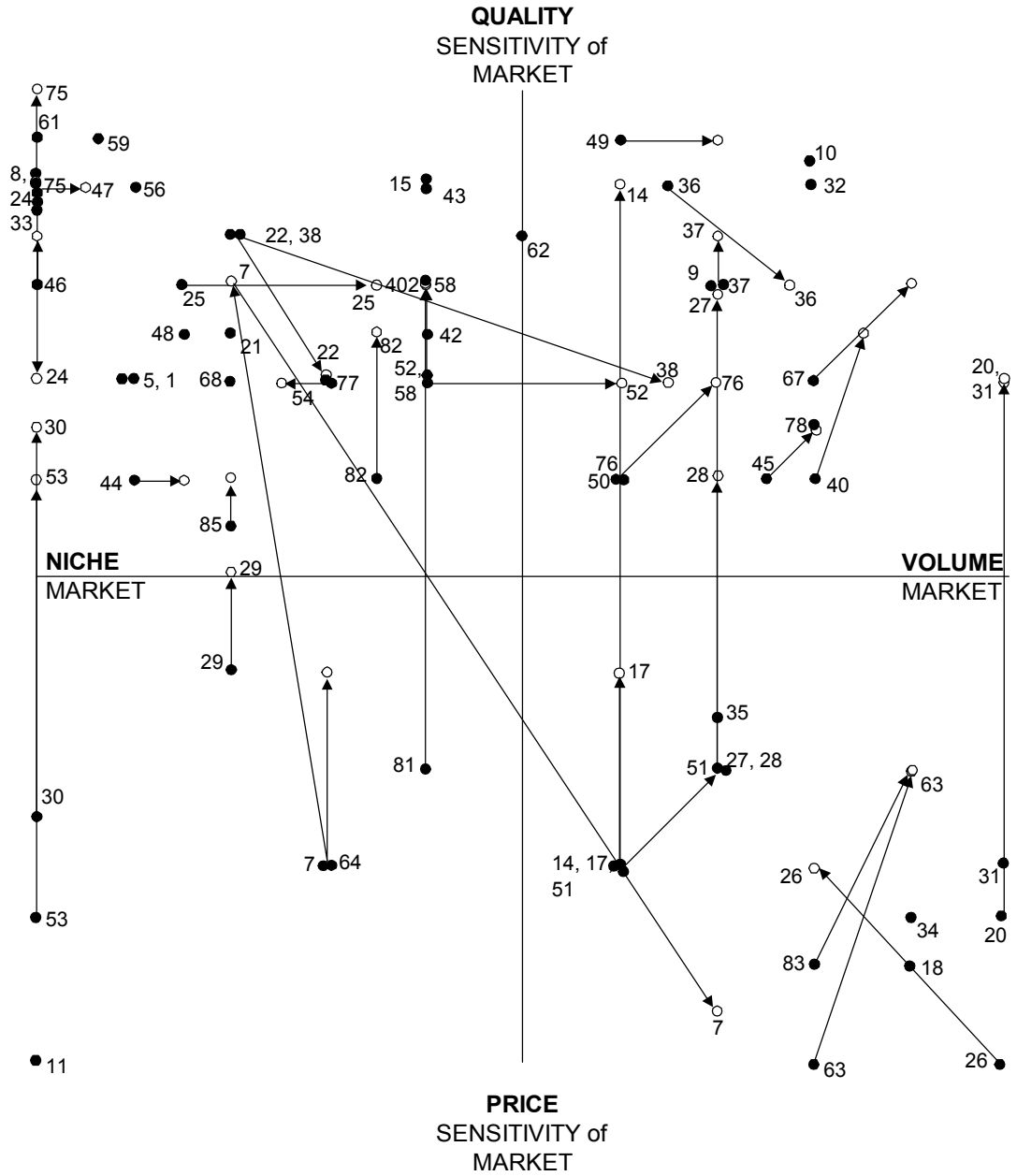


Figure 8: Market Map of all MADRID Phase One Products

Mapping of all MADRID Phase One Products

The mapping of all of the products from Phase One of the MADRID project that it was possible to map (64 in total) is shown in Figure 8. All of these products derived from the face-to-face interviews section of the CID database comprising 91 firms and projects from a total survey size of 221. There are a very high proportion of implemented and commercially successful products in this sub-sample. This was because the CID study tended to survey firms with non-implemented or failed design projects by postal questionnaire, and these did not contain sufficient market information to enable mapping. This hampered the comparison of successful and failed projects, and the analysis of failure factors.

Each product was mapped in the following way. A filled-in circle represents the starting position of a product on the market map. Each product is numbered with its CID ID number. Some products, as a result of the design project, moved in the market

– this is represented by a line with an arrow indicating the direction of movement (with an un-filled circle indicating the end-point of the move). Products which did not move are indicated by single filled-in circles.

Three observations can be made from Figure 8:

1) The two upper quadrants, Quality-Niche and Quality-Volume, are well populated.
2) The Price-sensitive/Volume market (lower right quadrant) is less well populated.
3) The Price-sensitive/Niche market (lower left quadrant) is least populated.

Results of Quality – Price Mapping

It was difficult to plot a number of products onto the MADRID market map, because it was difficult to say where they lay on the quality/ price dimension. This was particularly the case when a company repositioned its product within the market – by eg. moving up or down market. Some of these movements involved a change of both price *and* quality at the same time, making it difficult to place them on the quality-price scale. Therefore, it was decided to map these difficult products and a sample of normal products on the Quality-Price Map. This map (Figure 9) was useful in plotting a number of products, such as a manufacturer of electronic instruments (33) and detergents (17), both of whom simultaneously increased product quality and reduced price in their market moves. Similarly, a manufacturer of professional sound recording consoles (8) maintained its market position with a cost reduction project which had follow-on quality improvements.

Having first mapped the problematic products on the Quality-Price map it was easier to position them on the MADRID map. Looking at market movements was interesting. The sample of companies' products plotted showed two market strategies: broadly upward (move up-market) and broadly downward (move down-market). One company (11) maintained its quality but reduced its product price.

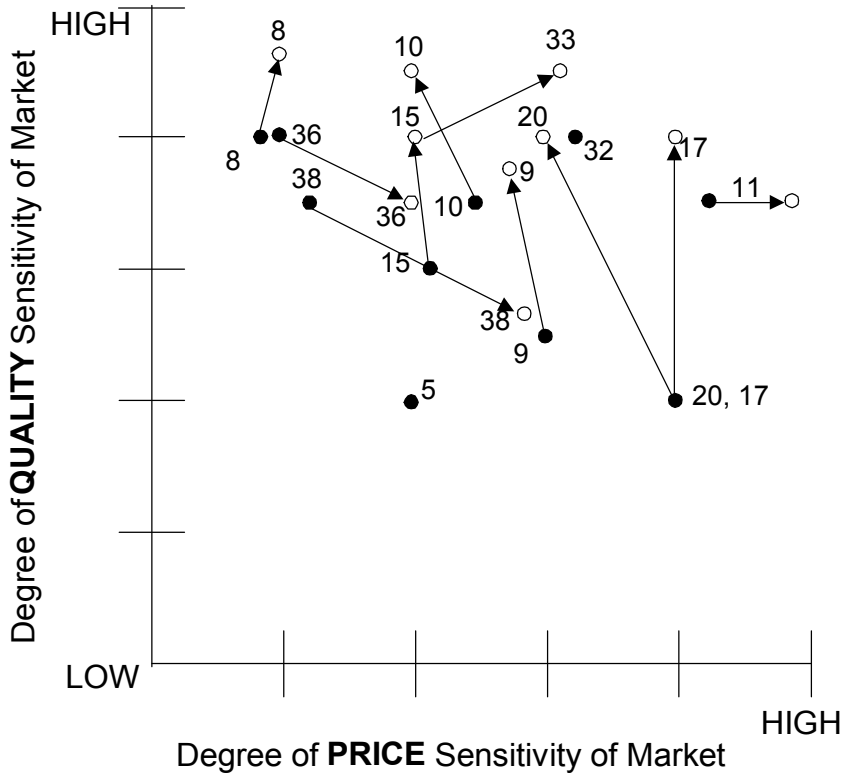


Figure 9: Sample MADRID Quality–Price Market Map

Commercial Performance Measures

Four measures of commercial performance of the design projects were used: two qualitative and two quantitative. The qualitative measures were project/ product implementation (whether or not the product was put into production and marketed) and whether the company considered the project a commercial success. The quantitative measures were the gross profit margin of the product when marketed and the payback period (the length of time in months for the total project costs to be recouped through profits on sales). The performance maps present the quantitative indicators in a bifurcated manner – whether the performance was better or worse than the average. The average figure used was the average of all 91 CID firms which had financial data, 14.4 months for payback and 36% for gross profit margin.

Mapping of Commercial Performance

The first, qualitative, commercial performance map was simply whether the project was implemented or not. This map essentially showed that all but seven projects out of the 64 were implemented and so it is not reproduced here.

The second, qualitative, commercial performance map indicated whether the project was judged a commercial success by the firm. As most implemented projects in the CID face-to-face sample were successful there were an insufficient number of commercial failures (seven) to make any definite interpretations of the map. However, it did show that each market quadrant had successful firms within it. Again the map is not reproduced here.

The quantitative commercial performance maps produced more variation, and hence useful information, on which types of markets were likely to reward investment in design – although there was a problem with data not being available for every product. Figure 10 shows the results of the gross profit margin mapping, and Figure

11 shows the results of the payback period mapping for the phase one MADRID products.

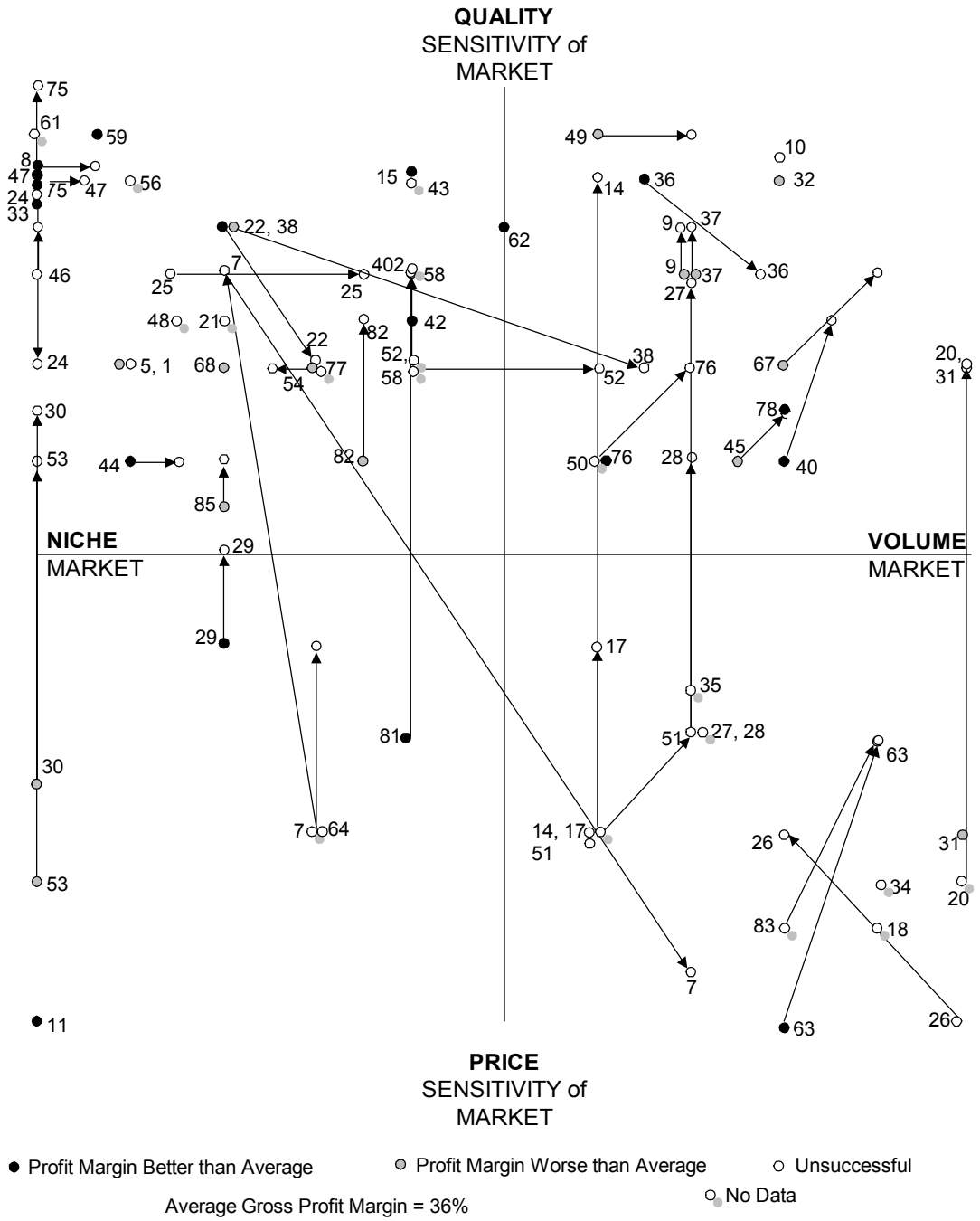


Figure 10: MADRID Market Map of Gross Profit Margin

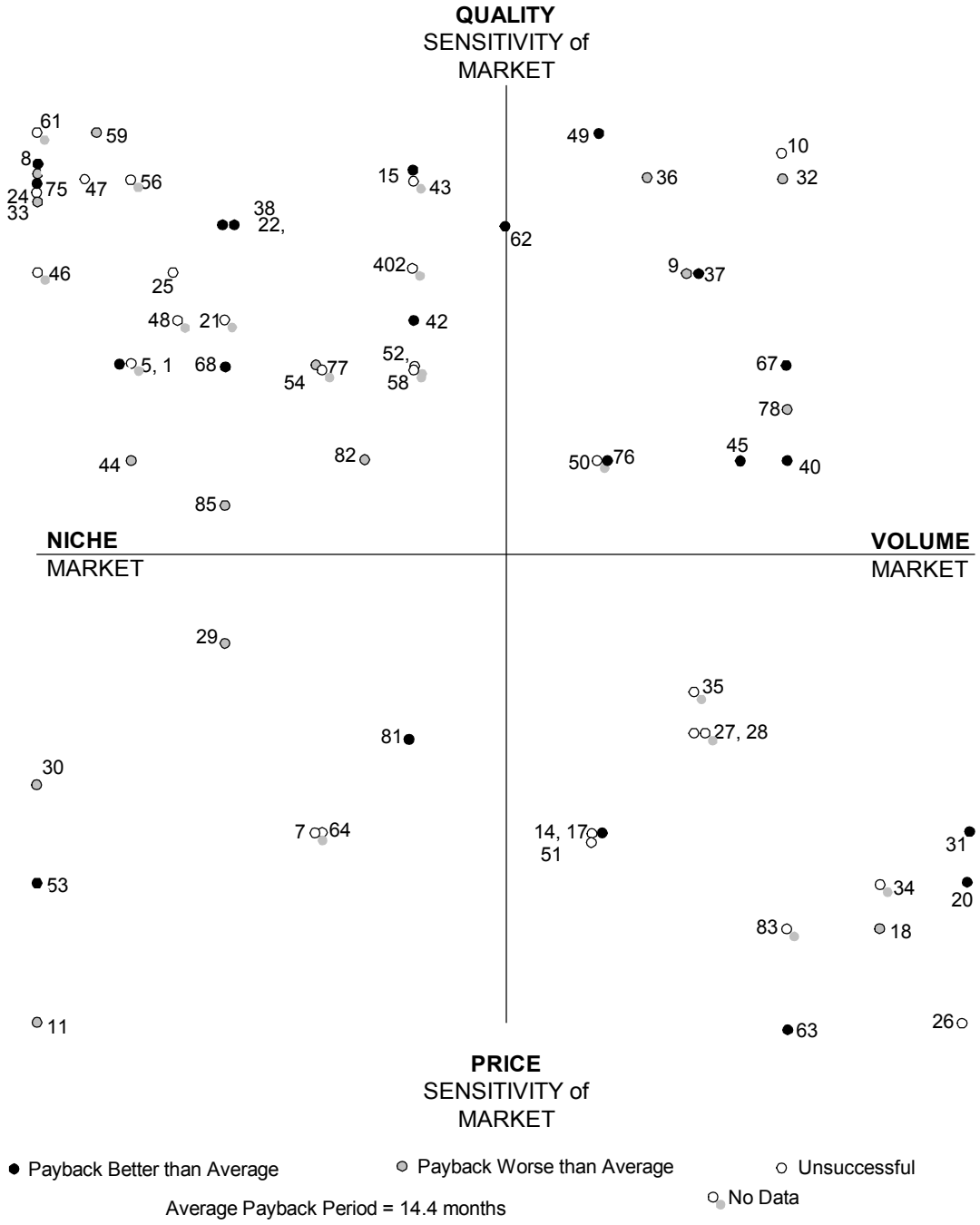


Figure 11: MADRID Market Map of Payback

Summary of Commercial Performance Mapping

The mapping of commercial performance can be summarised as follows. The implementation and commercial success maps were not very useful because most projects plotted were drawn from a sub-sample of CID projects which contained few failures.

The payback and gross profit margin maps showed more variation. The conclusions from these two market maps were:

1) There were commercially successful design projects in all market quadrants.

2) Most companies were attempting to move up-market via their design projects. Even those companies who already made high-quality products were moving up-market through investment in design expertise.

3) The exceptions were companies which made high-quality but relatively low volume products. These were generally attempting to increase sales volume and thus had to lower their prices, for example by using design for cost-reduction. Examples of this include a hi-fi amplifier manufacturer (38) and a cosmetics firm (36).

4) Both quality quadrants – Quality-Volume (QV) and Quality-Niche (QN) – were attractive markets in which to position products.

5) Generally companies in the sample were using design to move their products toward the Quality–Volume (QV) quadrant, with none moving out of it. This quadrant was a commercially very good one to be in, as companies can charge premium prices for high product quality whilst selling in volume.

6) There were two areas for commercial success – in which a significant number of commercially above average performing products were located (or had moved into) mid–Quality-Volume (QV) and mid–Quality-Niche (QN) markets.

7) The bottom left quadrant, Price-sensitive–Niche (PN) market is a low profit margin area and therefore design projects need to be low-cost to achieve a rapid payback on investment.

8) No companies appeared to be using design to move down-market (bar the exceptions mentioned above in 3) and certainly none crossed from the quality to the price-sensitive half of the map.

9) Niche players tend to be 'stickers' – staying in their quadrant.

10) Companies which were not attempting to move from their existing market position, through design, were predominantly already in the success quadrants, namely Quality-Niche and Quality-Volume markets (QN & QV).

11) There were examples of successful projects in the Price-sensitive–Volume market (PV – bottom right). Again, the firms concerned wished to gain competitive edge through adding value/ quality while reducing the price-sensitivity of their products through the use of design.

12) The Price-sensitive–Niche market quadrant (PN – bottom left) can be a problematic quadrant. It appeared difficult to succeed commercially in it and very difficult to get out of it. (Only one company, a plastics manufacturer (7), succeeded in doing so, through a two-stage diversification, first by developing a novel plastic wheelbarrow and then, having learned about the wheelbarrow market, moving to a conventional metal design).

13) Only one company, a maker of contract furniture (54), decreased its product's volume to have a niche product (which was a complement to the rest of the company's higher volume range).

In summary, the analysis indicateed that companies were generally attempting to use design to move their products up-market (vertical moves/ upward right moves) and/ or to increase their volume within the quality-sensitive volume market quadrant (rightward moves). No firms were using design to move down market (bar the exceptions of companies making high quality products which moderately reduced

quality and price in an attempt to move into a market with larger sales volumes). None crossed from the quality to the price sensitive half of the map.

CONCLUSION

This paper has presented the theory and results of mapping the markets in which companies' products compete. It formed part of phase one of the project on 'Identifying Markets That Reward Investment in Design', otherwise known as MADRID – MArket Demands that Reward Investment in Design. An extended discussion can be found in Riedel et al (1996). The other part of phase one, an analysis of the role of design in competition was presented in Roy & Riedel (1997). The origin of the MADRID project, as a follow on, and development of, the CID – Commercial Impacts of Design – study was discussed.

The theory of market mapping was discussed to arrive at a viable technique for analysing the market position of a company's products. A review of existing market mapping techniques was presented, from which a suitable map was derived. The resulting market map (the MADRID market map) was shown to work extremely well in carrying out the required mappings. Only in the case of companies trying simultaneously to increase price competitiveness and product quality was difficulty experienced in mapping products. The use of alternative maps – eg. the Quality-Price map – allowed these problematic products to be plotted. Other maps did not actually do what was required for the research. They did not cater for an analysis of design and the market, which was central to the research. The MADRID Market Map was a very useful tool for analysing the existing data from the CID study. It allowed both a mapping of companies' products and also an analysis of their commercial performance to be carried out.

The analysis of the MADRID market maps showed that companies were attempting to use design to move their products up-market (vertical moves/ upward right moves) and/ or to increase their volume within their existing quadrant (rightward moves). None was moving down market (bar the exceptions of high product quality companies trying to capture larger sales volumes). None crossed from the quality to the price sensitive half of the map.

The analysis of commercial performance maps showed that there are commercially successful products in all four market quadrants. There were two particular areas for commercial success – mid-quality niche markets and mid-quality volume markets. Companies aiming products at the price-sensitive volume market (PV – bottom right quadrant) were also successful. Again the companies concerned wished to use design to gain a competitive edge through adding value/ quality and reducing the price sensitivity of their products. The price-sensitive niche market (PN – bottom left quadrant) was a problematic quadrant. It is difficult to do well in it and very difficult to get out of it.

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