COMPETITIVE POSITIONING STRATEGY FOR NEW ZEALAND *PINUS RADIATA* IN SELECTED UNITED KINGDOM SAWN TIMBER MARKETS

R. J. COOPER,

University College of North Wales, School of Agriculture & Forest Science,
Bangor, Gwynedd, United Kingdom LL57 2UW

S. P. KALAFATIS,

Kingston University, Kingston Business School,
Kingston Hill, Kingston-upon-Thames, Surrey, United Kingdom KT2 7LB

and A. J. McPHERSON

New Zealand Forest Research Institute,
Private Bag 3020, Rotorua, New Zealand

(Received for publication 13 December 1993; revision 21 September 1995)

ABSTRACT

Product positioning in industrial markets is an important consideration when new materials or products are introduced into a mature market. An investigation was carried out into the position of established timber species as perceived by United Kingdom end-users of timber. Multi-dimensional scaling techniques were employed in obtaining and explaining the perceptual patterns of four market segments (i.e., general furniture, furniture frames, general joinery, and mouldings). The potential position of *P. radiata* D.Don was determined by overimposing objective measures of its physical properties. The findings indicated that although there were differences in the perceptions of the end-use segments, all four segments shared a common element in their differentiation of species as hardwoods or softwoods. It was proposed that *P. radiata* should be positioned amongst the premium softwoods. Therefore, promotional efforts should emphasise its superior finishing properties and should be supported by a unique selling proposition centred around the sustainable availability of long and wide clear lengths. Efforts should be aimed at end-users who exhibit diversity in their utilisation of species, e.g., manufacturers of mouldings.

Keywords: product position; market segmentation; multi-dimensional scaling; *Pinus radiata*.

INTRODUCTION

The heart of modern strategic marketing, for both consumer and industrial products, has been described as STP marketing—segmentation, targeting, and positioning (Kotler 1991). In many respects these three aspects are inseparable and consequently should be viewed as a continuum rather than as discrete marketing activities (Fig. 1).

Market Segmentation	1. Identify segmentation variables and segment the market 2. Develop profiles of resulting segments
	⬇
Market Positioning	3. Evaluate the attractiveness of each segment 4. Select the target segment(s)
	⬇
Product Positioning	5. Identify possible positioning concepts for each target segment 6. Select, develop, and communicate the chosen positioning concept

FIG. 1–Steps in market segmentation, targeting, and positioning (source: Kotler 1991).

The process of partitioning a market into smaller homogeneous submarkets which exhibit different needs, characteristics, or behaviour and which might require separate products or marketing mixes is "market segmentation" (Kotler & Armstrong 1994). Evaluation of the relative attractiveness of the identifiable segments enables the provider of products and/or services to target one or more of these segments and to develop products and marketing programmes tailored to each of the selected segments (i.e., targeting). Having chosen the market target(s), the provider must then decide on its positioning in those segments—that is, determine its value proposition stating how it wants its goods and services to be viewed by customers compared to those of its competitors.

Although the notion of positioning has been developed in consumer markets it is, nevertheless, increasingly viewed as an important strategic concept for industrial products and services as well (Webster 1991). Within this context product positioning represents the place that a particular product occupies in a particular market and is obtained by measuring organisational buyers' perceptions and preferences for a product in relation to competitive products (Hutt & Speh 1992).

Furthermore, there is little doubt that once the focus of marketing orientation changes from the product to the customer, the customer's mind becomes the central point of marketing activities. In this respect positioning is "... not what you do to a product; positioning is what you do to the mind of the prospect ..." (Ries & Trout 1981).

RATIONALE

The theme of STP marketing within the industrial domain has been investigated by Doyle & Saunders (1985) who have proposed the following seven-step approach:

Step 1 Define objectives
Step 2 Determine market segments
Step 3 Evaluate the attractiveness of alternative segments
Step 4 Select target markets
Step 5 Develop a positioning strategy

Step 6 Develop a marketing mix

Step 7 Validate the strategy.

The research reported here deals specifically with Step 5 of the above approach, although some references to issues related to market segmentation are also made.

It is well accepted that a product or service is more than a simple transaction; instead it comprises a bundle of benefits (both physical and intangibles) sought by buyers—thus the notion of the augmented or extended product. Therefore, although competing products may be physically identical, one can be more acceptable than others because of some additional reason(s) which motivates buyers to prefer it over competitive ones (Cunningham & Roberts 1974; Banting 1976). To develop this theme we can refer to Kotler (1991) who distinguished three levels of product:

(1) The core product: This refers to the minimum benefits provided by a product or a service.

(2) The tangible product: Product characteristics (such as branding, packaging) are introduced to the core product.

(3) The augmented product: Here additional benefits (such as delivery, technical support) are introduced.

To the above, Levitt (1986) added a fourth level which he termed the potential product (Fig. 2). Although the proposed schema provides a clear illustration of the different product levels, a number of problems associated with its actual application have been voiced. In particular it is often very difficult to identify those elements of augmentation which are most likely to result in higher levels of sales. Furthermore, even when the important elements have been identified, the problem of achieving a competitive advantage and ensuring that the augmentation is profitable still remains.

Aim and Objectives

The research reported here addresses issues related to the competitive positioning of New Zealand *Pinus radiata* (NZPR) in selected end-use segments within the United Kingdom market. The basic aim is to propose a communications framework which encompasses only those product aspects which comprise the generic or core level of a product. In this respect the present paper deals with positioning as determined by physical properties (or attributes) of solid timber (i.e. issues related to support, services etc. are not dealt with here). Finally, given the low level of market share of NZPR in the United Kingdom market the problem is viewed as one of positioning of a relatively new timber species.

More specifically the main objectives are as follows:

(1) To obtain a spatial representation of end-users' perceptions of different established timber species;

(2) To determine the number of dimensions on which end-users' perceptions are based;

(3) To identify the timber properties or attributes which can explain existing perceptual patterns;

(4) To determine whether there are differences in the perceptions of end-user groups and identify sources of such differences;

(5) To define the potential position of NZPR, based on objective measurements.

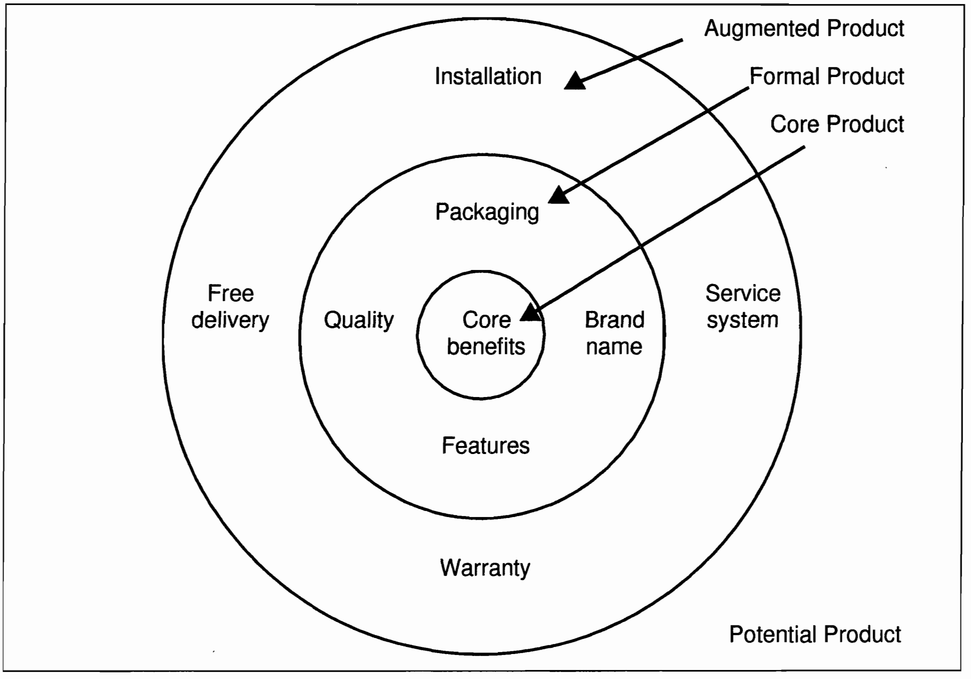

FIG. 2–Augmented product concept.

METHODOLOGY

Research about product positioning is concerned with groups of customers and competitive products. It deals with consumers' needs, perceptions, beliefs, and attitudes about available products and consequently it must be viewed as a multidimensional problem (Hooley & Saunders 1993). The methodology followed in the research reported here attempted to take the above into consideration in terms of both collection and analysis of data.

Data Collection

Data were collected from United Kingdom end-users of timber. Although it was felt that personal interviews represented the best method of data collection, the highly fragmented and geographically dispersed nature of the United Kingdom timber trade meant that a postal survey was the only realistic and cost-effective means of data collection. The suitability, in terms of reliability, of mail surveys for this type of research is supported by similar work carried out previously in the United Kingdom (Kalafatis 1985) and in the United States (Meyer *et al.* 1992; Forbes *et al.* 1993).

Initial qualitative research, in the form of in-depth personal interviews, was employed to define and refine the constructs under investigation (e.g., timber attributes, timber species). The information was formulated into a questionnaire which, after piloting, was mailed to the population of interest. In the design and piloting of the questionnaires careful consideration was given to issues of good practice and presentation (Hoinville & Jowell 1978; Hunt *et al.* 1982; Oppenheimer 1993).

Data Types

In order to ensure consistency of results and obtain a basis for reliable segmentation, the respondents were asked to specify two timber species they used and one product manufactured. This information was carried throughout the questionnaire, i.e., all questions were cross-referenced to either the product or species named by each respondent. As suggested by Schiffman *et al.* (1981) the following information was obtained:

Attribute importance: The respondents were asked to rate the importance of the following list of physical properties/attributes in the production of their main timber-based product. A seven-point scale (1 = very unimportant, 7 = very important) was employed to provide a balance between ease of use and sufficient choice (Green & Rao 1972).

Colour	Ring width
Machinability	Shakes and/or splits
Dimensional stability	Bending strength
Durability	Impact strength
Figure	Surface finish
Knot frequency	Surface hardness
Knot size	Texture

This list of physical attributes was compiled as a result of the preliminary in-depth personal interviews. Detailed machining properties were included in the original draft of the questionnaire, but were combined to represent one attribute (i.e., machinability) since during the piloting it was found that each respondent's importance rating was very similar for all the machining processes. These data were employed primarily in the verification of an *a priori* classification of the responding firms.

Similarity judgements amongst all pairs of stimuli: Respondents provided similarity ratings (on a seven-point scale: 1 = very dissimilar, 7 = very similar) of the timber species which they used with those on the following list.

Beech		*Fagus sylvatica* L.
Douglas fir		*Pseudotsuga menziesii* (Mirb.) Franco
Hemlock		*Tsuga heterophylla* (Raf.) Sarg.
Meranti		*Shorea* spp.
Obeche		*Triplochiton scleroxylon* K. Schum
Pine—	lodgepole	*Pinus contorta* Loudon
	maritime	*Pinus pinaster* Aiton
	parana	*Araucaria angustifolia* (Bert.) O. Ktze.
	ponderosa	*Pinus ponderosa* P.Lawson et Lawson
	southern yellow	*Pinus* spp.
Ramin		*Gonystylus bancanus* Kurz.
Redwood		*Pinus sylvestris* L.
Whitewood		*Picea abies* (L.) Karsten

Once again, the list was compiled on the basis of in-depth personal interviews and by reference to United Kingdom national statistics. While it is by no means exhaustive it did cover a wide range of timber species commonly used by United Kingdom end-users of solid timber at the time of the research.

Given that, at the time of the research, NZPR was a relatively new entrant to the United Kingdom market, it was not reasonable to expect respondents to be able to provide an assessment of the similarity of NZPR to other species. Therefore, objective measures of performance, i.e., under test conditions, were employed to obtain a measure of similarity of NZPR with those species mentioned by the respondents. These measures were bending strength, stiffness, impact strength, side hardness, durability, and dimensional stability and the values were obtained from USDA (1974), BRE (1977), Webster (1978), and Lavers (1983). The use of such data was believed to be justified because, if a well-defined and executed marketing approach was to be followed, the eventual position of NZPR would be based on users' accurate knowledge of the species' properties which in turn should be identical to those values obtained from scientific tests on the material.

The data obtained were used to derive perceptual maps depicting the relative position of different species (*see* Data Analysis section). Perceptual maps were derived from the species used by respondents, and because not all the species listed were used by each respondent, the results do not cover all the listed species. The emphasis of this survey on softwoods is apparent; the hardwoods (beech, meranti, obeche, and ramin) were included because some respondents perceived NZPR as a potential substitute for these species. Furthermore, since no *a priori* assumption was made as to the perceived positioning of NZPR it was necessary to start with a wide market specification. Finally, although it is common for this type of analysis to collect data as rank order measurements, ratings have also been found to constitute reliable means of obtaining similarity measures (Seaton 1974).

Species performance on the selected attributes: The respondents were requested to evaluate the species most familiar to them on the same list of timber properties/ attributes (1 = very poor performance, 7 = excellent performance). The assumption was made that respondents' answers might or might not be related to objective assessments of the timber species. Their evaluations were also assumed to be related to their level of knowledge of and experience with particular timber species and the suitability of these species for specific applications (Green & Wind 1973). Possible problems associated with inter-personal differences of scale perceptions were eliminated by normalisation of the raw data.

These data were viewed as fundamental to the research because they were employed in defining those attributes that are determinant (as compared to salient or non-determinant attributes—*see* Hutt & Speh 1992, p.282, for clarification of terms) and consequently are both important and differentiating (Hansotia *et al.* 1985). The data obtained were used as input to PROFIT (*see* Data Analysis section) in order to explain the configurations depicted in the perceptual maps.

Data Analysis

In addition to classical inferential statistics, the analysis of the data collected made extensive use of Classical Multidimensional Scaling techniques (CMDS) which refer to a suite of programs primarily concerned with the spatial representation of relationships among behavioural data (Green *et al.* 1989). CMDS is a set of mathematical techniques which enable the researcher to uncover "hidden structures" of databases. CMDS comprise a set of powerful mathematical procedures which can systematise data by representing the similarities of stimuli (in this case timber species) spatially as in a map (Schiffman *et al.* 1981). Given a set of observed measures of proximities (in the form of either similarities or dissimilarities) between stimuli these figures are transformed into a spatial representation of the stimuli as points in a Euclidean space such that the interpoint distance in some sense matches the observed proximities (Jain *et al.* 1982). Therefore, the points are arranged so that geometrical relationships, such as distance between the points, reflect the "empirical" relationships in the data.

In reviewing the findings it is important to remember that, as Shepard (1972) noted, CMDS may serve as a guide, but never as a substitute for careful understanding or creative thought in the understanding of behavioural data. He also stated that the representation should not be regarded merely as an end in itself, as its purpose is to enable the investigator to gain a better comprehension of the total underlying pattern of relationships in the data and to decide what further analysis may be necessary.

CMDS procedures are now well established within the fields of psychometrics and marketing. Their suitability and robustness, in terms of addressing issues similar to those investigated here, are well documented and the interested reader is referred to Cooper (1983) for a review of general and marketing applications and Kalafatis (1994) for a timber-related application. Consequently, extensive explanations of the techniques are not presented here; instead, whenever necessary, interpretative guidelines are provided in the analysis section of this paper. The CMDS techniques employed were KYST (for actual positioning of the species—based on similarity data) and PROFIT (for identification of the determinant attributes which can explain the configuration obtained from KYST—based on species performance ratings obtained from the respondents and textbooks). Full descriptions of the types of CMDS techniques and various computer models have been given by Green & Rao (1972), Kruskal & Wish (1978), Schiffman *et al.* (1981), Coxon (1982), and Green *et al.* (1989), among others. The CMDS models used in this study were from the PC-MDS Multidimensional Statistics Package (Smith 1988).

The actual analytical flow is illustrated in Fig. 3 where it can be seen that the first task was to obtain, based on objective measures, a spatial configuration of the timber species

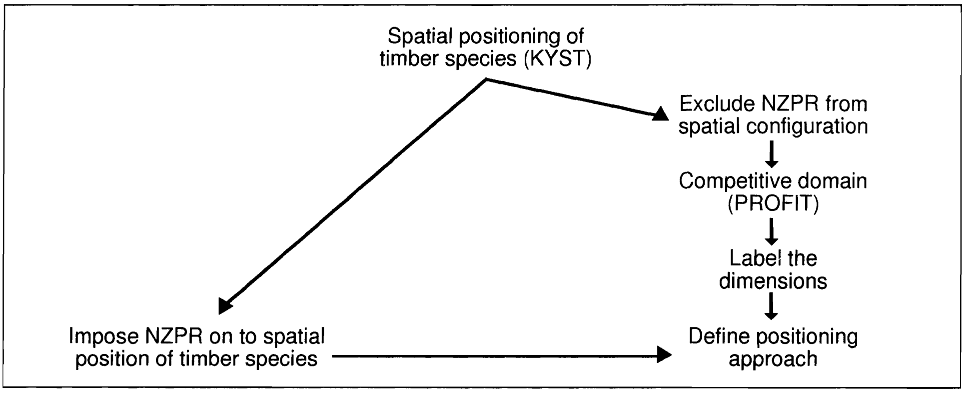

FIG. 3–Analytical procedure followed.

mentioned by the respondents and of NZPR. Once a satisfactory solution was obtained, the position of NZPR was taken out of the configuration. The performance ratings (as provided by the respondents) of the rest of the species on the selected attributes were then overimposed on the derived spatial configuration in order to (a) explain the structure of the competitive domain and (b) define the underlying dimensions of the configurations. The rationale for excluding NZPR from the second stage of the research was based on the low level of familiarity of United Kingdom timber end-users with the properties of NZPR. Finally, by re-introducing the position of NZPR on to the competitive domain the implications for positioning NZPR could be assessed. This process was repeated separately for each end-user group.

Sample Frame

The population surveyed comprised all United Kingdom wooden joinery and furniture manufacturers. The following sources were employed as sample frames:

- Trade association directories
  - Furniture Manufacturers Association
  - British Kitchen Furniture Manufacturers Association
  - Chair Frame Manufacturers Association
  - Association of Suppliers to the Furniture Industry
  - British Wood Turners Association
  - British Woodworking Federation
- The Kompass Register of British Industry and Commerce (excluding companies obtained from the trade association directories)
  - Chapter 25: Wood and Cork Products
  - Chapter 26: Furniture

Care was taken to exclude companies which did not use wood, or were agents or merchants as opposed to manufacturers, but because of the way that companies are classified this was not always possible. Companies classifying themselves as manufacturers of components, as opposed to joinery or furniture, were also included.

As a consequence of the above procedure, the number of companies eligible to be used for the sample frame was as follows:

		No. of companies
Furniture:	Trade Associations	216
	Kompass Register	237
Joinery:	Trade Associations	218
	Kompass Register	340
Total		1011

A proportionally stratified sample of 250 firms, giving a sampling fraction of 24.7%, was devised. Given that no reliable estimates of timber consumption by end-use sector were available, the stratification was based on number of firms in each sector.

Response Rate

The "Total Design" method proposed by Dillman (1978) provided the guidelines followed in the actual mailing of the questionnaires. Intended respondents were pre-notified

(Ford 1967; Durham & Wilson 1990; Schlegemilch & Diamantopoulos 1991) and the name of the academic institution sponsoring the research (McKee 1992) was used in order to increase response rate.

A total of 88 usable replies, giving a 35.2% response rate, were received. This response rate, although slightly below reported averages attained by industrial postal surveys (Hart 1987; Moore 1989), compares favourably with those achieved by comparable studies (e.g., Forbes *et al.* 1993). Based on the actual products manufactured, the respondents were classified under one of the following segments:

Furniture (other than frames)	19
Furniture frames	12
General joinery	41
Moulding	16

The above classifications are very broad (e.g., the "General joinery" segment included manufacturers of doors, windows, conservatories) and consequently there may be some confounding effects. Given the exploratory nature of the research it is believed that such limitations do not detract from the findings presented in this paper. For further clarification, the category "Furniture frames" referred to manufacturers of upholstered furniture who use timber for structural framing of chairs and other items. "Furniture" referred to manufacturers of all types of solid wood furniture where timber is used mainly in an exposed form.

Subsequent analysis of response data and a follow-up telephone survey of non-respondents confirmed that the respondent base was broadly representative of the original sample frame and hence of the industries being surveyed.

RESULTS

Segmentation

In order to determine whether this classification of timber end-users provided a valid basis for segmentation, respondents' rating scores of the importance of the 15 timber properties were analysed using MANOVA (*see* Hair *et al.* 1990 for a detailed explanation of the MANOVA procedure employed).

This approach is similar to benefit segmentation which recognises that customers buy identical products for different reasons and consequently place different values on particular product features/properties (Haley 1968; Moriarty & Reibstein 1986). The rationale behind the choice of these variables as a basis of segmentation is based on:

(a) the premise that the requirements of a specific application determine the importance of properties in that application, and

(b) the hypothesis that perceived species similarities are based on the properties they are perceived to possess.

Therefore, the importance of physical attributes to the products manufactured is considered to be a true reflection of a particular respondent's perceptual framework and consequently provides a valid means of market segmentation.

The approach taken in this analysis followed that recommended by Green & Rao (1972), in that the analysis was performed on a number of pre-specified, homogeneous subgroups.

This combined the advantages of disaggregate analysis, in that individual differences were not lost, with the time-saving advantages of aggregate analysis*.

The MANOVA analysis indicated that there were significant differences between the predefined end-user groups (Pillai's Trace p value = 0.000). The significance of each timber attribute, presented in descending order of univariate contribution, is presented in Table 1; five of the 14 timber properties (i.e., colour, ring width, impact strength, surface finish, and texture) produced significant differences in responses between the end-user groups.

Based on the MANOVA analysis, it was clear that the predefined groups could be viewed as being very distinctive and consequently aggregate analysis within each of the distinctive groups was justified.

TABLE 1–Univariate contribution and significance of each dependent variable

Property	F Value	P > F
Surface finish	5.38	0.001
Colour	4.77	0.002
Impact strength	3.91	0.006
Texture	3.18	0.017
Ring width	2.78	0.032
Figure	2.25	0.070
Dimensional stability	2.10	0.087
Machinability	1.68	0.161
Shakes & splits	1.41	0.238
Surface hardness	1.37	0.252
Knot size	0.77	0.550
Bending strength	0.68	0.605
Durability	0.65	0.627
Knot frequency	0.25	0.910

Positioning of Timber Species

General furniture products (other than frames)

Eleven species were mentioned as being used by respondents belonging to this end-user group. These were beech, lodgepole pine, mahogany, oak, ramin, redwood, sapele, teak, African walnut, American walnut, and whitewood. The respondents' perceived similarities of the above listed species, expressed in the form of a correlation matrix, were analysed using the KYST program. Analysis was undertaken in two and three dimensions in order to determine the appropriate dimensionality and the corresponding stress† values were 0.1314 and 0.0183 respectively.

---

* Performing aggregate analysis on pre-specified, homogeneous subgroups of respondents is less time-consuming than building up homogeneous subgroups of respondents based on individual differences scaling of each respondent.

† Stress is the term used to describe the level of error, or "badness of fit", between the original data and the derived configuration points. One objective of CMDS is to minimise the level of error.

Based on Kruskal's (1964) criteria‡, the level of stress for three dimensions indicated an "excellent" to "perfect" fit and, as expected, stress decreased from two to three dimensions. Therefore the spatial similarity configuration was interpreted in three dimensions and is shown in Fig. 4 together with the property fitting analysis which, using the PROFIT program, explains the differences in the position of species by superimposing on the spatial configuration obtained from KYST the corresponding property rating of each species. The results are presented in Table 2.

All timber properties were significant, at $\alpha = 0.05$, in explaining the relative position of the species. This was felt to be questionable, given the true significance of the multiple correlation coefficient as presented in PROFIT§, i.e., it is highly unlikely that all the attributes would be significant in differentiating between species. Therefore, although no theoretical support exists, it was decided to follow the empirically derived guideline provided by Green *et al.* (1989) which suggested that only the properties with a rho score greater than 0.75 would be considered as significant. This criterion was adopted throughout the analysis.

In interpreting the solution the following points should be taken into consideration:

(a) The smaller the angle between an attribute vector and a dimension axis, the more closely related the attribute is to that dimension. For example, in Fig. 4(a) bending strength is closely related to Dimension II.

(b) The closeness of a timber species to the arrowhead of a vector, measured at right angles to the vector, indicates the amount of that attribute present in the species. For example, teak, ramin, and African walnut were perceived as having higher bending strength than American walnut or sapele (Fig. 4(a)).

(c) If the angle between two vectors is close to 180° this indicates that the vectors are negatively correlated. For example, in Fig. 4 it is implied that species with large knots are perceived as having very low bending strength.

The relative position of the timber species, and the timber property/attribute vectors, are depicted in Fig. 4. To aid interpretation of the three-dimensional solution two configurations are presented.

---

‡ Kruskal (1964) defined the following as a suitable guide to the goodness of fit of a spatial map.

Stress value (%)	Goodness of fit
20	poor
10	fair
5	good
2.5	excellent
0	perfect

§ Schiffman *et al.* (1981) noted that it was not advisable to use the multiple regression significance tests in the usual way for property fitting and preference analyses. This was because the stimulus co-ordinates are not independent and therefore significance levels are inflated. Consequently a conservative approach was suggested. They went on to state that if the significance test indicated a non-significant relationship this was a clear indication of lack of significance. On the other hand, if it was indicated that the relationship was very significant, let us say at $\alpha = 0.001$, then one might conclude that the attribute (or one like it) was being used by the respondents. Finally, they concluded that when a nonmetric option was employed, there was no clearly defined test of significance. In the present analysis this was something that made it even more difficult to determine what constituted a large correlation value.

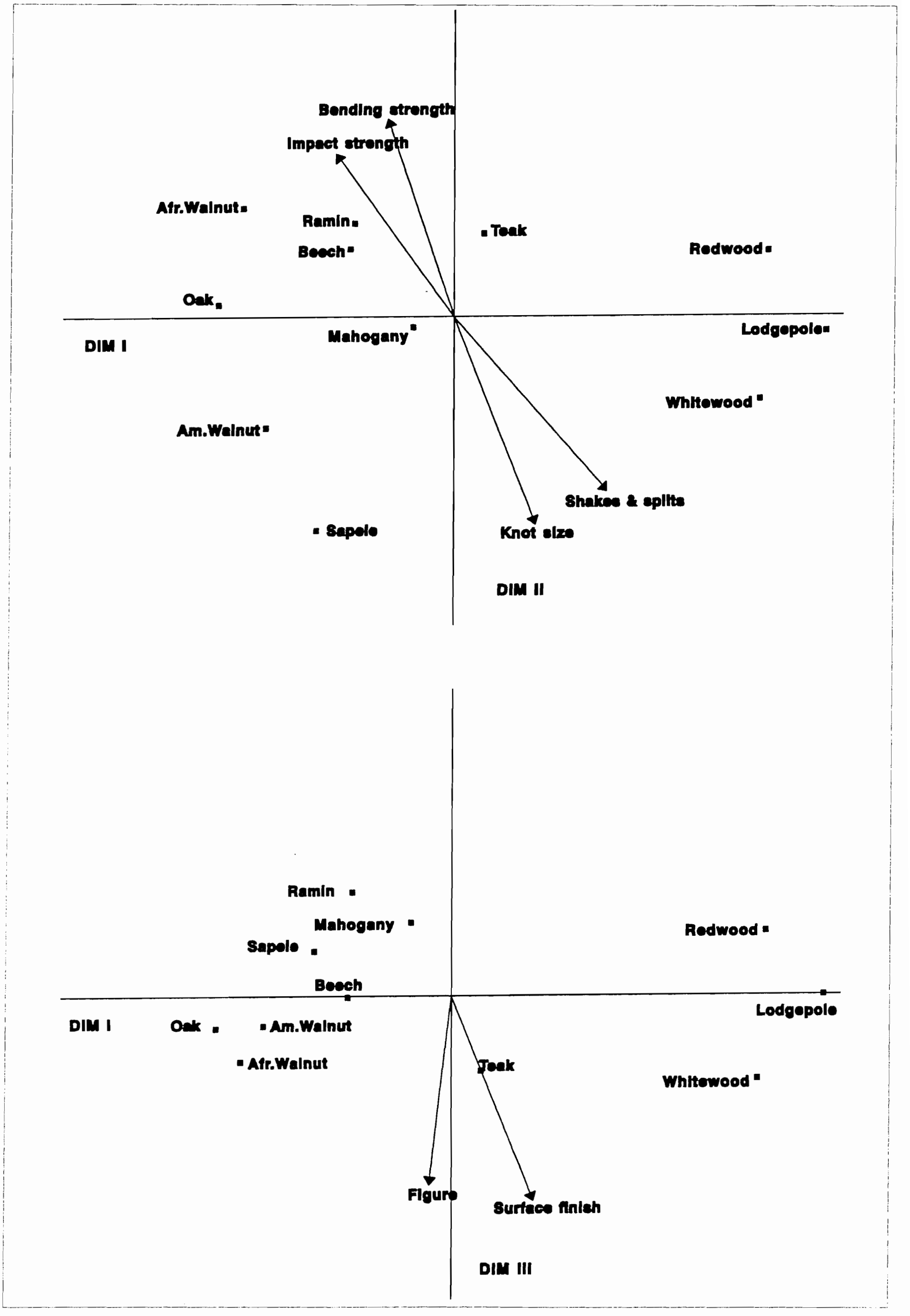

FIG. 4–Spatial configuration of timber species and timber property vectors—General furniture.

TABLE 2–Maximum correlation† between properties and the projections on the fitted vector—General furniture

Property		Rho	Significance
Figure		0.9064	***
Bending strength		0.8918	***
Shakes & splits		0.8764	***
Surface finish		0.8722	***
Impact strength		0.8138	***
Knot size		0.7553	***
Colour		0.7225	***
Surface hardness		0.7015	***
Durability		0.6834	***
Machinability		0.6772	***
Texture		0.6736	***
Knot frequency		0.6386	**
Stability		0.6257	**
Ring width		0.5767	**
Critical values at differing levels of significance	0.01	0.6628	***
	0.05	0.5266	**
	0.10	0.4500	*
	NS = not significant		

† The correlation coefficient (rho score) measures the extent to which each attribute vector explains the differences between the species points in the spatial configuration.

There is clearly a polarisation in the position of hardwoods and softwoods. Although no property vectors explained the difference between hardwoods and softwoods on Dimension I, this does not mean that it was not a valid basis for differentiation. It was apparent that furniture end-users perceived hardwoods and softwoods to be different, without consciously basing this on specific timber properties, i.e., hardwoods and softwoods were perceived to be different for no other reason than that they were hardwoods or softwoods.

In considering the relative position of timber species to the vectors in Dimension II, it should be noted that species such as teak, oak, and beech, all known to be strong timbers, are positioned closer to the vector head than less strong species (e.g., whitewood). It is argued that the overall position of individual species was determined by (a) reference to a property that dominated the performance of the particular species, and (b) by species' performance on properties that the end-users viewed as determinant.

In this particular end use, where finishing properties are very important, the position of species with good bending strength which do not possess decorative properties (e.g., sapele) was difficult to explain. On the other hand, the positioning of predominantly decorative species (e.g., the walnuts) appeared easier to interpret. It also seems that whitewood fills a niche in the furniture market for appearance reasons only (e.g., knotty pine furniture).

It can be concluded that there was a distinction made between hardwoods and softwoods, but there were also differences more readily attributed to specific timber properties. Therefore the dimensions can be labelled as follows:

Dimension I	hardwood/softwood
Dimension II	strength properties
Dimension III	finishing properties & appearance.

When the potential position of *P. radiata*, based on objective measurements, was obtained it was not surprising to find that this lay within the softwood domain (Fig. 5).

Furniture frames

Six species were used by respondents belonging to this end-user group—beech, birch, mahogany, maple, redwood, and spruce. As before, solutions for two and three dimensions were obtained and the respective stress values were 0.0093 and 0.0034. Although the two-dimensional solution appeared to provide an almost perfect solution, with the low number of species involved it was prudent to interpret the solution with care.

The species groupings (Fig. 6) appeared to provide a coherent picture. The four hardwoods (birch, beech, mahogany, and maple) were grouped together, as were the softwoods (redwood and spruce) and no outlying species were evident. Therefore, as with general furniture manufacturers, it could be concluded that manufacturers of furniture frames perceived a clear differentiation between hardwoods and softwoods.

However, when the ratings of the species properties were introduced into the analysis the rho scores obtained from the solution were all 1.0, indicating a perfect fit between the property vectors and species points. Although this could have been the result of omitting properties specific to this market segment, given the exhaustive preliminary research it is more likely to indicate a potentially unstable solution. Therefore, the property-fitting analysis using timber attributes is not included here.

However, the distinct differences between hardwoods and softwoods in Dimension I of the spatial configuration suggest that respondents in this group, as in the general furniture group, viewed species as primarily softwoods or hardwoods without consciously relating the difference to specific timber properties.

The potential position of *P. radiata* for this end-use is presented in Fig. 7 and follows the same pattern as for general furniture.

General joinery

Eleven species were listed by respondents classified as general joiners; these were ash, Douglas fir, hemlock, iroko, keruing, lauan, mahogany, meranti, oak, redwood, and whitewood. The stress values for two- and three-dimensional solutions were, respectively, 0.0812 and 0.0481. The level of stress for two dimensions indicated a "fair" to "good" fit, while the level of stress for three dimensions indicated a "good" fit. In addition, the decrease in the level of stress between two and three dimensions was considerable (halved) and so the spatial similarity configuration was interpreted in three dimensions. The results of superimposing timber property attribute vectors on the species similarity spatial configuration are presented in Table 3.

As outlined above, analysis was restricted to the most significant attributes (i.e., those with a rho score in excess of 0.75). From the configuration presented in Fig. 8 it is evident that, as with the other end-uses, Dimension I could be labelled as the softwood *v.* hardwood dimension. The attributes associated with Dimension II were the physical properties (i.e., knot size, ring width, and shakes) and the appearance property, colour. The properties associated with Dimension III were figure and knot frequency.

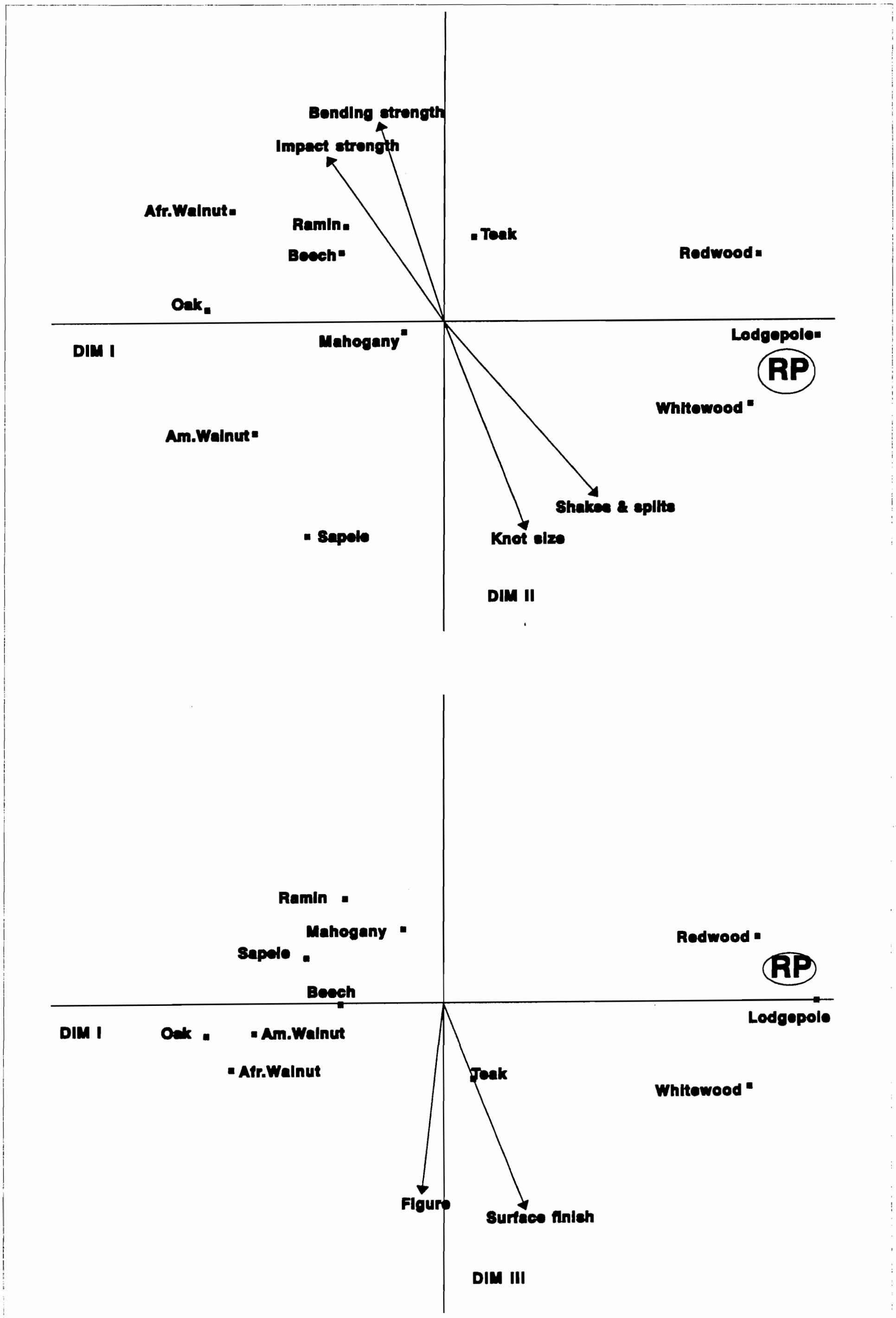

FIG. 5–Positioning of *Pinus radiata*—General furniture.

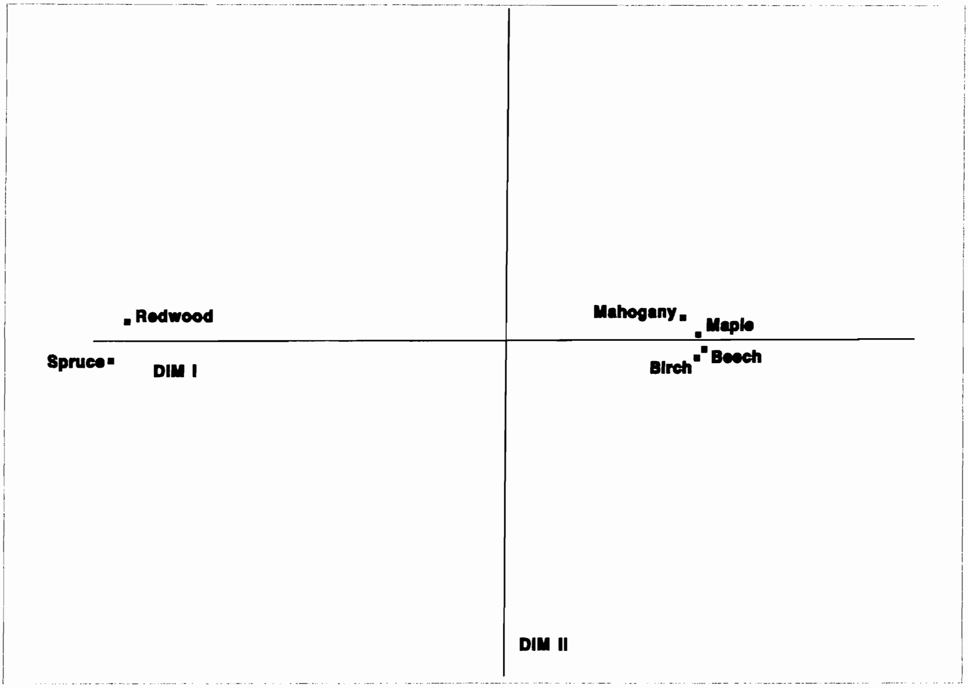

FIG. 6–Spatial configuration of timber species—Furniture frames.

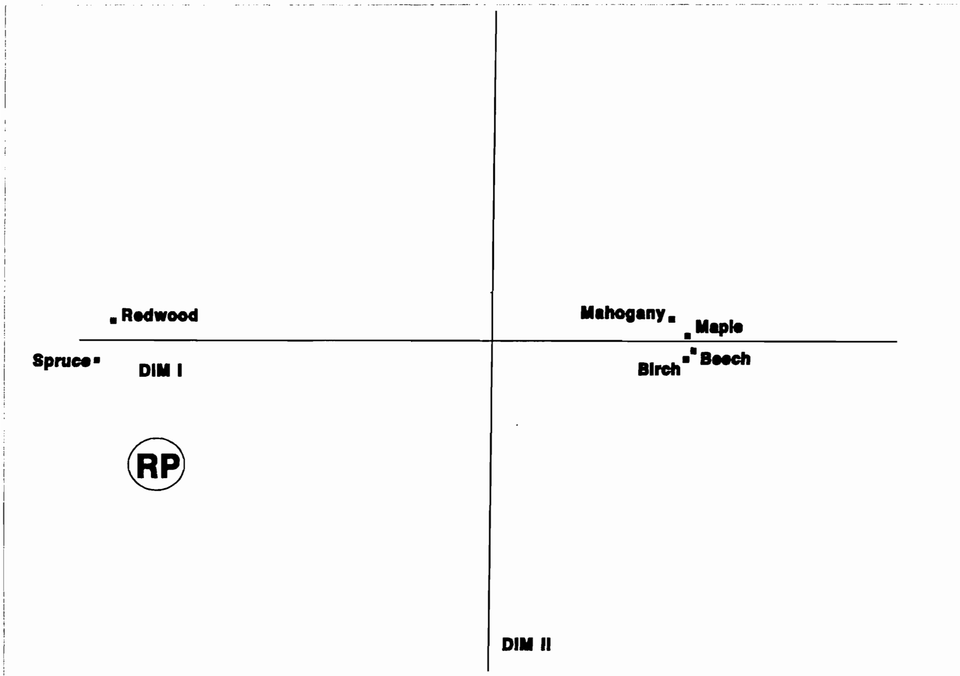

FIG. 7–Positioning of *Pinus radiata*—Furniture frames.

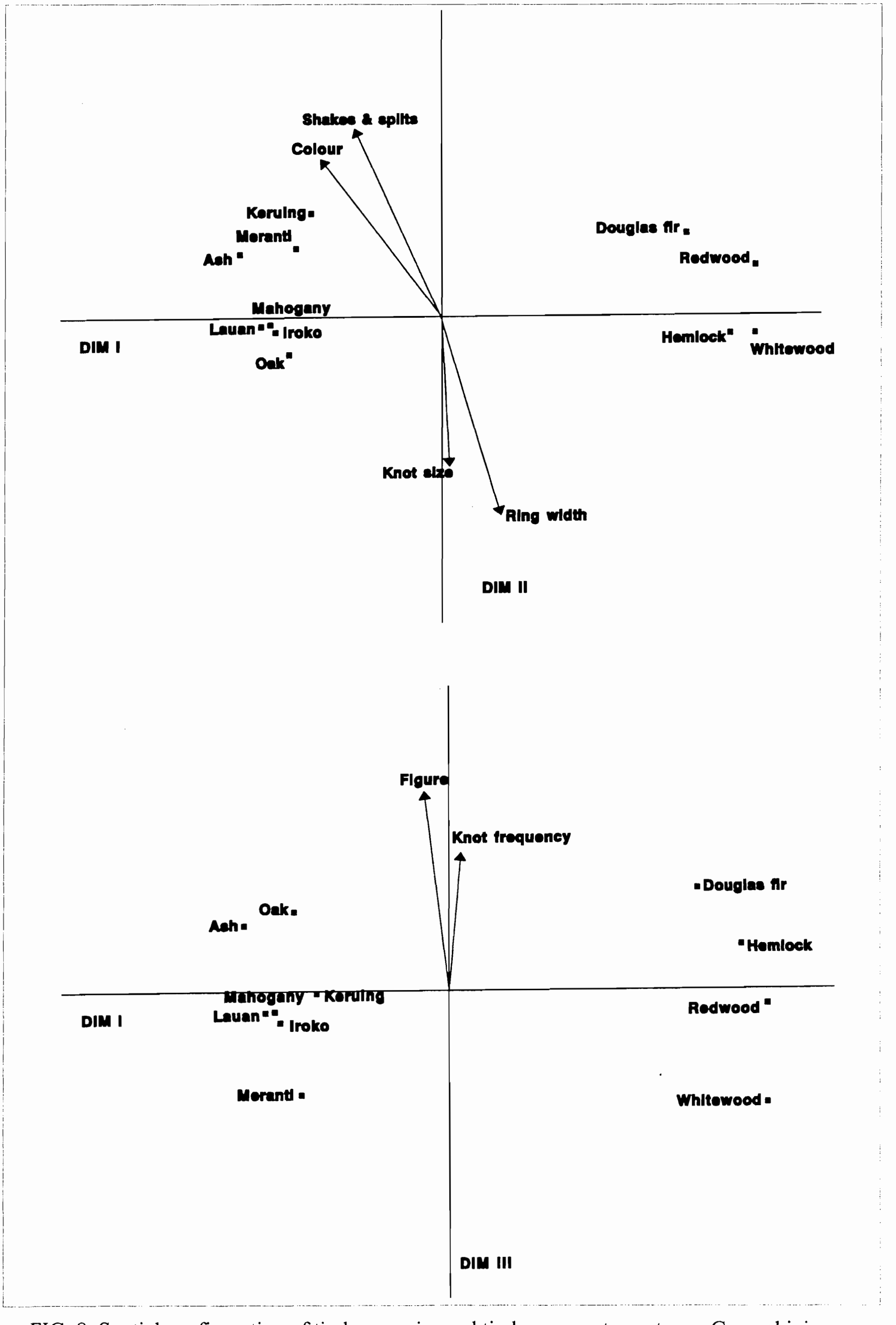

FIG. 8–Spatial configuration of timber species and timber property vectors—General joinery.

TABLE 3–Maximum correlation between properties and their projections on the fitted vector—General joinery

Property	Rho	> 0.75
Knot size	0.8229	*
Shakes & splits	0.8189	*
Colour	0.8067	*
Figure	0.7958	*
Ring width	0.7894	*
Knot frequency	0.7528	*
Surface hardness	0.7425	
Texture	0.5665	
Durability	0.4750	
Surface finish	0.3884	
Dimensional stability	0.3240	
Impact strength	0.2198	
Bending strength	0.2243	
Machinability	0.1741	

In considering the relative position of timber species to the attributes associated with Dimension II it should be noted that while colour differentiated between some of the lighter and darker timbers (e.g., keruing and oak), the position of others (e.g., ash and meranti) contradicted this. Therefore it was concluded that while the physical and appearance properties explained some of the differences in Dimension II, other attributes were also likely to be influencing the relative position of timber species.

In considering the relative position of timber species to the properties in Dimension III it should be noted that knot frequency differentiated between the clear grade softwoods (Douglas fir and hemlock) and the generally knotty redwood and whitewood. The relative position of hardwoods in this configuration appeared better explained by figure, differentiating between the light-coloured figured hardwoods (oak and ash), and the darker hardwoods. It was concluded that the darker hardwoods were considered less figured than the light hardwoods with distinctive grain patterns. The same pattern appeared within the two softwood groups. Among the clear softwoods Douglas fir has a more distinct grain pattern than hemlock, as does redwood compared with whitewood.

Therefore it can be concluded that the dimensions should be labelled as follows:

Dimension I	hardwood/softwood
Dimension II	physical attributes and colour
Dimension III	appearance

The position of *P. radiata* (Fig. 9) was similar to that for furniture end-users.

Mouldings

Sixteen species were listed by manufacturers of mouldings; these were ash, Douglas fir, hemlock, lauan, mahogany, oak, obeche, parana pine, pitch pine, ponderosa pine, Quebec yellow pine, ramin, redwood, Southern yellow pine, western red cedar, and whitewood. As before, the stress values from two- and three-dimensional solutions were 0.1258 and 0.0733 respectively, indicating a three-dimensional solution.

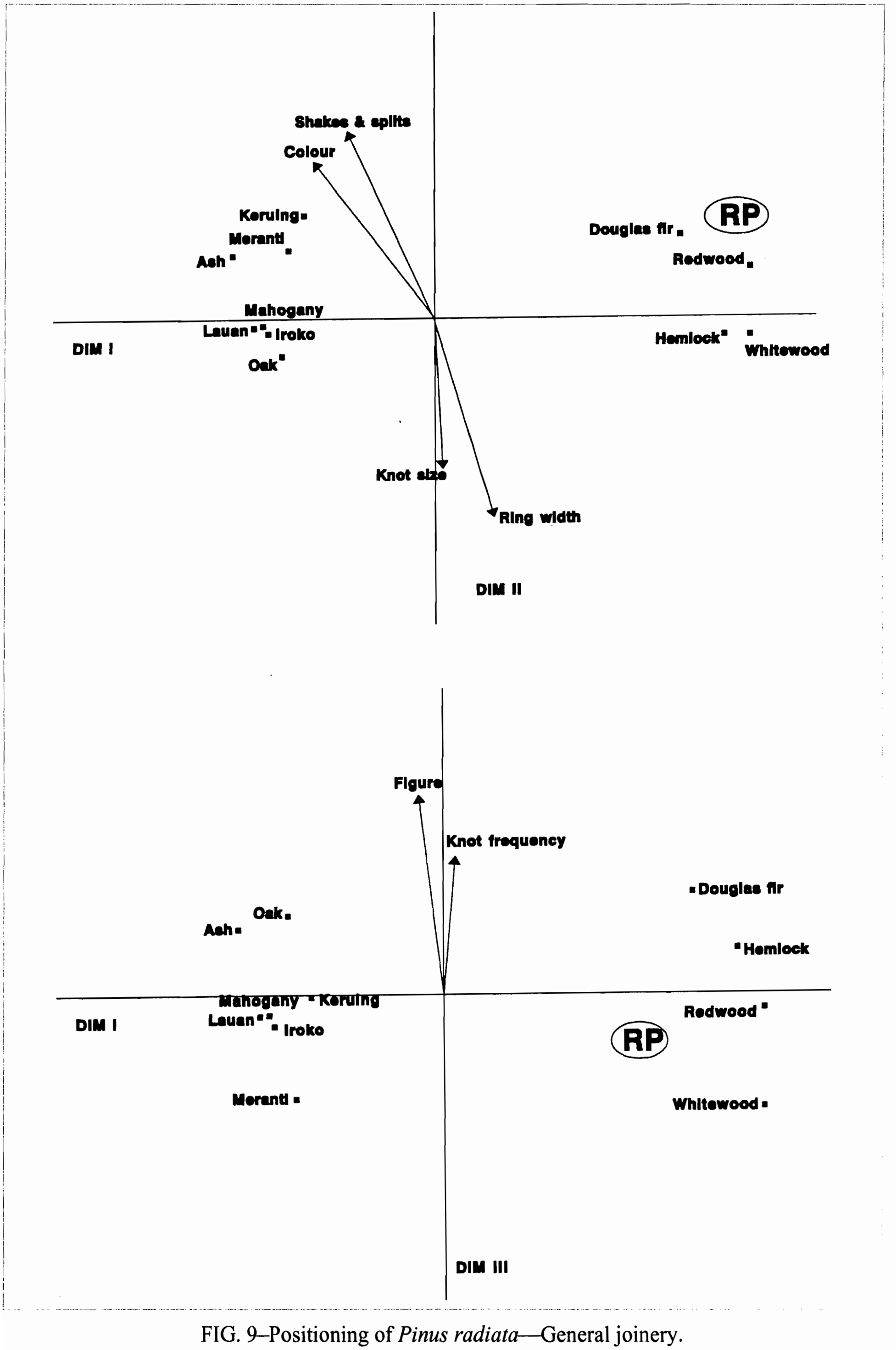

FIG. 9–Positioning of *Pinus radiata*—General joinery.

The results of imposing timber property attributes on the species similarity configuration are presented in Table 4 and Fig. 10. Using the rho score >0.75 criteria, only one attribute (surface finish) was important in differentiating between species.

TABLE 4–Maximum correlation between properties and their projections on the fitted vector—Mouldings

Property	Rho	> 0.75
Surface finish	0.7745	*
Machinability	0.5953	
Durability	0.5809	
Dimensional stability	0.5669	
Ring width	0.5440	
Knot size	0.4991	
Texture	0.4631	
Figure	0.4226	
Surface hardness	0.3716	
Knot frequency	0.3331	
Bending strength	0.2952	
Impact strength	0.2760	
Shakes & splits	0.2578	
Colour	0.2533	

It was evident that, as for the other end-uses, Dimension I could be labelled as a softwood *v.* hardwood dimension. There were no significant timber attributes associated with Dimension II, and the attribute associated with Dimension III was surface finish.

The lack of significant timber attributes associated with Dimension II does not necessarily imply an unstable solution. This dimension did appear to differentiate between softwoods and hardwoods on the basis of colour, with red/brown species (i.e., lauan, mahogany, western red cedar, parana pine), to yellow brown species (ponderosa pine, southern yellow pine), to white/lighter coloured species (whitewood).

In considering the relationship of timber species to surface finish in Dimension III, it should be noticed that the vector generally differentiated between some species on which it is relatively easy to obtain a good finish (e.g., ponderosa pine, redwood, lauan) and those on which it is more difficult (e.g. southern yellow pine, western red cedar, oak). However, the position of some species recognised as possessing excellent finishing properties (e.g., parana pine, Quebec yellow pine) further from the vector head suggested that other attributes were influencing their position.

Therefore the dimensions could be labelled as follows.

Dimension I	hardwood/softwood
Dimension II	colour
Dimension III	surface finish

For this end-user group *P. radiata* appeared to be positioned close to the higher value, clear-grade timber species such as parana pine, hemlock, and Quebec yellow pine (Fig. 11).

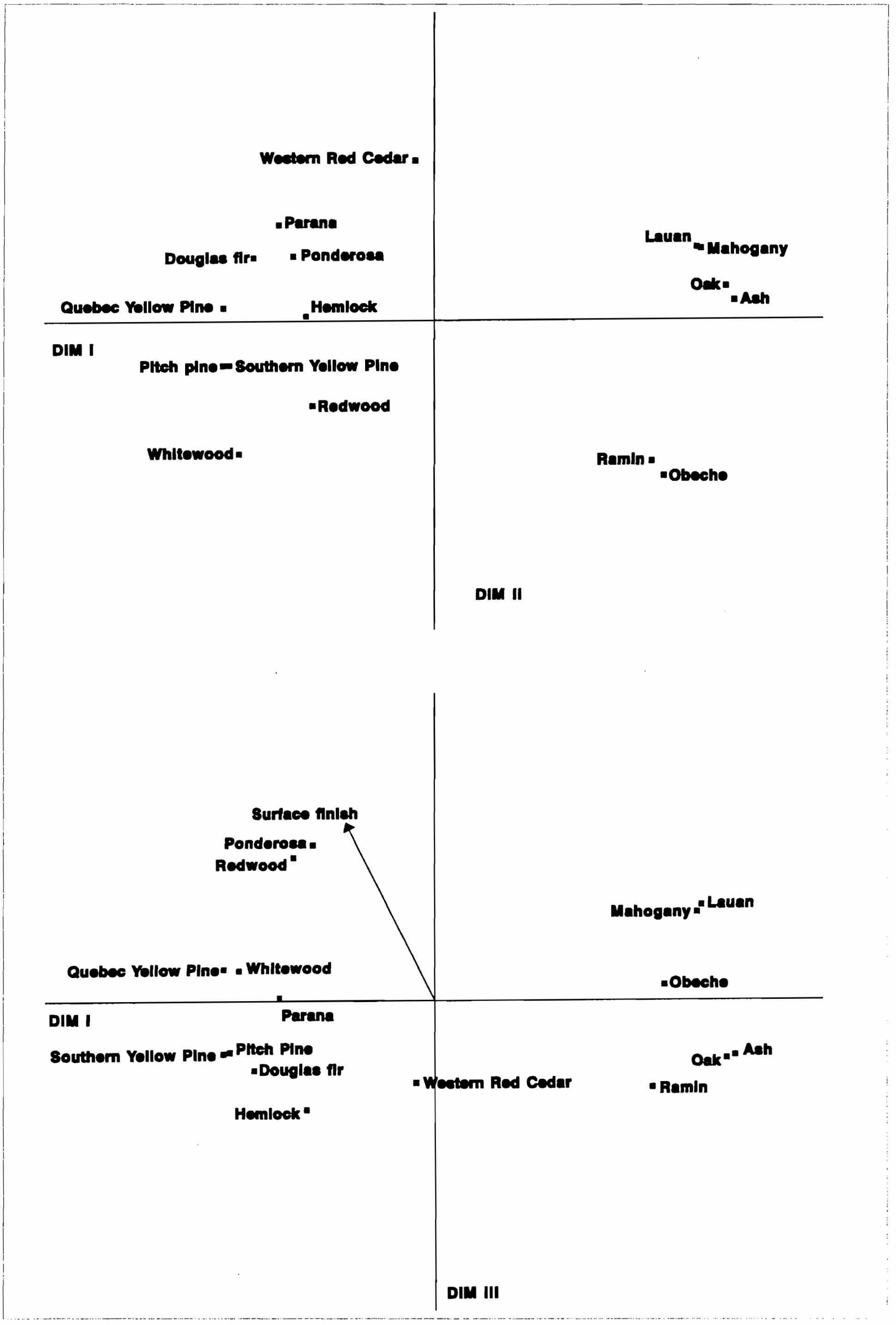

FIG. 10–Spatial configuration of timber species and timber property vectors—Mouldings.

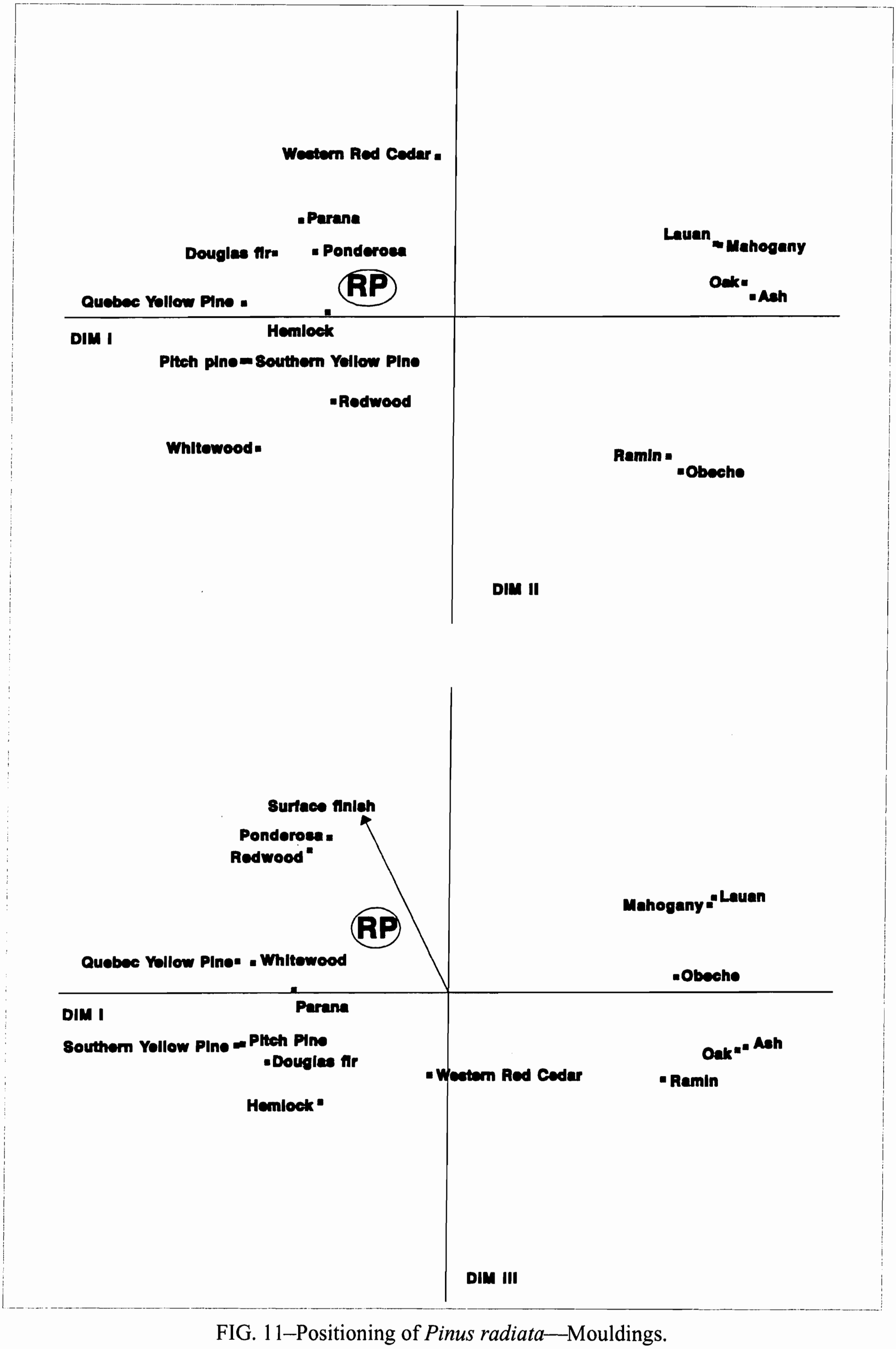

FIG. 11–Positioning of *Pinus radiata*—Mouldings.

DISCUSSION

Kotler (1991) identified a number of criteria to be satisfied if a difference is to be worth establishing in a positioning strategy. He stated that the difference must be important to a sufficient number of buyers, be distinctive in some way, be superior, and be pre-emptive, i.e., not easily copied. For industrial products, Doyle & Saunders (1985) also noted the importance of a difference that is not easily copied and added that it must also be sustainable. One final consideration is not only which attributes or factors to promote, but also how many. Each of these issues is considered in this section and an overall conceptual framework for alternative and evolving positioning strategies presented. It must be remembered that the research presented here dealt only with those product elements which comprise the core level of NZPR.

Positioning Criteria

Examination of the differentiating attributes and the domain-defining dimensions (*see* Table 5 for a summary of findings) led us to the conclusion that the differences identified were both important and distinctive/determinant (Hutt & Speh 1992). In terms of superiority, NZPR is a superior finishing timber while being adequate in terms of strength, stability, and hardness (Seabright 1990). On the other hand, NZPR is not superior in terms of durability, but its ease of preservation and resultant long service life establish a superior difference. In addition, parallel research on commercial and marketing issues (McPherson 1992) revealed that a sustainable and regular supply of long clears, and the quality of the technical back-up, could be seen as superior differences, whereas generally the production, distribution, and marketing aspects of the industry needed to be improved.

TABLE 5–Summary of findings

	Dimension 1	Dimension 2	Dimension 3
Furniture (other than frames)	Hardwoods/Softwoods	Strength Bending strength Impact strength Knot size Shakes & splits	Finishing & Appearance Figure Surface finish
Furniture frames		Inconclusive results	
General joinery	Hardwoods/Softwoods	Physical Attributes & Colour Shakes & splits Colour Knot size Ring width	Appearance Figure Knot frequency
Mouldings	Hardwoods/Softwoods	Colour	Surface Finish

Of the differentiating core product attributes presented in Table 5, the superior finishing properties of *P. radiata* (as well as its other physical attributes) are least easy to copy and are by definition sustainable differences. In addition, the research and technical back-up developed at the New Zealand Forest Research Institute over the years could be seen as being less easy to copy and therefore sustainable.

Attributes to be Promoted

Given that most products (including NZPR) have a number of differentiating characteristics which are worth promoting in order to achieve a distinct market position, it does not necessarily follow that all such characteristics should be promoted. Such an approach has the potential for information overload, i.e., increased disclosure of information about a product may have undesirable effects as buyers become confused and make poorer choices (Jacoby 1984; Keller & Staelin 1987; Engel *et al.* 1990).

Therefore, the issues to be addressed are how many differences and which differences to promote to the target customers. Many marketers advocate aggressively promoting only one or a small number of benefits. Reeves (1960) proposed that a unique selling proposition (USP), based on one benefit, be promoted throughout a campaign. This approach has the advantage of a clearly defined strategy, but runs the risk of not fully promoting all the key benefits or attributes of the product (Kotler 1991). For this reason, it is proposed that a limited number of secondary selling positions (double or even triple benefit positioning) should be employed in efforts to position *P. radiata*.

As noted by Cown (1989), NZPR solidwood is capable of meeting all but the most exacting of solidwood uses. NZPR is recognised as having competitive advantages in machining, treating, and gluing (FOA 1991) and is gaining a reputation within the United Kingdom as a premium-grade finishing softwood (McPherson 1990). More specifically, because NZPR provides a sustainable supply of a premium-finishing softwood which is also available in longer and wider clear grades than most other softwoods, this should form the basis of the USP. In addition, NZPR's strength, durability, and stability also need to be stated, because of possible end-user beliefs regarding the properties and suitability of fast-grown plantation softwood. As for specific end-uses, NZPR's finishing and appearance properties should be promoted for furniture (other than frames) and for joinery and mouldings.

Framework for Positioning of *Pinus radiata*

The findings presented here can be formulated into a conceptual framework (Fig. 12) using the guidelines proposed by Hooley & Saunders (1993) and Aaker (1982):

(a) The consolidation position is usually appropriate for market leaders and occasionally for non-leaders with a strong image. Given the small volumes of imports of NZPR into the United Kingdom, for the time being, this option is not applicable.

(b) Although gaining market share from well-established products can be difficult, where an unfulfilled need or want exists a provider can employ latent positioning to establish a reputation. The appeal of the core product should focus on the propositions/attributes stated above, i.e., premium machining, gluing, treating, and finishing rather than on specific applications*.

(c) Depositioning is directly competitive, although the competitors may not always be mentioned. Although this would seem a viable option for NZPR, past research (Kalafatis 1983, 1985) has clearly demonstrated that promotional efforts based on the theme of species substitution have failed, and consequently should not be pursued.

---

* This approach is very similar to the concept of the positioning bridge which seeks to anchor a product to its core identity by using two words—one functional and one emotional or psychological.

Strategy	Generic position: Consolidation	Latent position	Deposition	Membership
Attribute				
Price/quality				
Competition				
Application				
User				
Product class				

FIG. 12–Positioning alternatives (source: Hooley & Saunders 1993).

(d) Finally, membership positioning is attractive for lower-order providers within a product market. This option is viewed as especially appropriate for the general joinery and moulding uses where, as demonstrated, NZPR can be positioned closely to premium softwood species.

As Hooley & Saunders (1993) stated, a feature of successful products is their ability to maintain their position over a long period of time, as a consequence of which they develop a strong identity. At the same time there are changes in the market place and over a product's life cycle which necessitate alterations/modifications in the strategies followed.

Park *et al.* (1986) provided a framework which could guide strategic actions through a product's life cycle (Fig. 13). The model was based on the premise that the path to be followed depends upon the needs being met by the product, whether functional, symbolic, or experiential. The options explored here are based on the premise that NZPR is used to fulfil both functional and experiential needs.

(a) During introduction the positioning objective should be to establish the product's foothold in the market, to create awareness of the product and what it provides. Focus

	Introduction	Elaboration	Fortification
Positioning objective	Establish image	Enhance value of the image	Brand concept association
Functional	Functional problem-solving capabilities	Problem-solving/ specialisation	Image bundling: new products with functional concepts
Symbolic needs	Reference group/ ego enhancement association	Market shielding	Image bundling: new products with symbolic concepts
Experiential	Cognitive/sensory stimulation concepts	Brand assessory/ brand network	Image bundling: new products with experiential

FIG. 13–Positioning life stages (source: Park *et al.* 1986).

upon appropriate applications and attributes of NZPR would address the functional and experiential aspects of the product, respectively. The positioning message should be relatively unsophisticated, while the distinct identity of NZPR should be maintained. It is suggested that, at this stage, NZPR should be aimed at builders' carpentry and joinery and miscellaneous wooden articles such as beadings and mouldings (McPherson 1992) where the superior finishing properties can be promoted.

(b) As NZPR becomes well known, elaboration of its position would become necessary. The main aim at this stage would be to enhance the perceived values of NZPR, something that can be achieved through either specialisation or generalisation. Given the tactile nature of the product and the findings presented here, a specialisation approach focusing on applications requiring longer and wider clear lengths than other applications would seem advisable.

(c) Fortification, which takes place late in the life of a product, may occur where the strengths of the original brand are used to umbrella new products. With NZPR this could be achieved by providing value-added products and materials, such as components. However, unless this is carefully controlled an otherwise clearly defined position could be diluted by proliferation with associated products (Saunders 1990).

It is important to note the sequential nature of the proposed approach. Although anecdotal in nature there are a number of examples where efforts to position timber species in the United Kingdom market have failed not because of any inherent problems or deficiencies of the products themselves but due to unstructured marketing efforts.

CONCLUSIONS

The above analysis clearly illustrates that despite significant differences in their requirements, in terms of properties of species, the four end-user groups under investigation appeared to share one common element in their perceptual positioning of different timber species—namely, a differentiation between hardwoods and softwoods. Furthermore, there is evidence to indicate that their perceptual patterns, although not always obvious, are complex. This latter finding is believed to reflect the fact that the perceptions of the United Kingdom end-use segments surveyed were based on experience rather than being acquired through some form of education.

A final point to be made is that although the above discussion has concentrated on some of the communications aspects of positioning NZPR, it would, nevertheless, be a mistake to approach the subject solely as a promotional strategy (Morris 1992). Certainly, promotional efforts can assist in establishing, reinforcing, or changing a product's position (this is especially true for consumer products). For industrial goods (such as NZPR), the impact of product/service performance features, pricing arrangements, after-sale support, and the efforts of distributors can have a significance equal to if not greater than promotional activities on buyers' perceptions and thus the positioning of the products.

We hope that this paper has (a) provided an insight into the perceptions of timber end-users in selected United Kingdom markets, (b) given an account of a methodology which can be used to derive such perceptions, and (c) proposed a sequential approach to the marketing of NZPR in selected United Kingdom markets. However, it is important to stress that before a comprehensive marketing approach can be defined, research on the other product levels (i.e., formal, augmented, and potential) must be carried out.

REFERENCES

AAKER, D.A. 1982: Positioning your product. *Business Horizon 25(3)*: 56–62.

BANTING, P.M. 1976: Customer service in industrial marketing: A comparative study. *European Journal of Marketing 10(3)*: 136–45.

BRE 1977: "A Handbook of Softwoods". 2nd edition. HMSO, London.

COOPER, L.G. 1983: A review of multidimensional scaling in marketing research. *Applied Psychological Measurement 7(4)*: 427–50.

COXON, A.P.M. 1982: "The User's Guide to Multidimensional Scaling". Heinemann Educational Books, London.

COWN, D.J. 1989: Diversifying processes and products from New Zealand radiata pine. *In* "Creating a Climate for Growing", Proceedings of a seminar to address the issue of attracting investment into New Zealand forestry. New Zealand Manufacturers' Federation and Ministry of Forestry, Wellington.

CUNNINGHAM, M.T.; ROBERTS, D.A. 1974: The role of customer service in industrial marketing. *European Journal of Marketing 8(1)*: 15–25.

DILLMAN, D.A. 1978: "Mail and Telephone Surveys: The Total Design Method". John Wiley & Sons, New York.

DOYLE, P.; SAUNDERS, J. 1985: Market segmentation and positioning in specialised industrial markets. *Journal of Marketing 42(2)*: 24–32.

DURHAM, D.F.; WILSON, R.D. 1990: Prenotification and industrial survey responses. *Industrial Marketing Management 19*: 95–105.

ENGEL, J.F.; BLACKWELL, R.D.; MINIARD, P.W. 1990: "Consumer Behaviour". 6th edition. The Dryden Press, Orlando, Florida

FOA 1991: "NZ Radiata Pine Generic Promotions Strategy". New Zealand Forest Owners' Association, Wellington.

FORBES, C.L.; SINCLAIR, S.A.; LUPPOLD, W.G. 1993: Wood material use in the US furniture industry: 1990 to 1992. *Forest Products Journal 43(7/8)*: 59–65.

FORD, N. 1967: The advance letter in mail surveys. *Journal of Marketing Research 4(2)*: 202–4.

GREEN, P.E.; RAO, V.R. 1972: "Applied Multidimensional Scaling: A Comparison of Approaches and Algorithms". Holt, Rinehart and Winston Inc., New York.

GREEN, P.E.; WIND, Y. 1973: "Multivariate Decisions in Marketing". The Dryden Press, Hinsdale, Illinois.

GREEN, P.E.; CARMONE, F.J.; SMITH, S.M. 1989: "Multidimensional Scaling: Concepts and Applications". Allyn and Bacon, London.

HAIR, J.F.; ANDERSON, R.E.; TATHAM, R.L. 1990: "Multivariate Data Analysis with Readings". 2nd edition. Macmillan Publishing Co., New York.

HALEY, R.I. 1968: Benefit segmentation: A decision-oriented research tool. *Journal of Marketing 32*: 30–5.

HANSOTIA, B.J.; SHAIKH, M.A; SHETH, J.N. 1985: The strategic determinacy approach to brand management. *Business Marketing 70*(Fall): 66–9.

HART, S. 1987: The use of the survey in industrial market research. *Journal of Marketing Management 3(1)*: 25–38.

HOINVILLE, G.; JOWELL, R. 1978: "Survey Research Practice". Heinemann Educational Books, London.

HOOLEY, G.J.; SAUNDERS, J. 1993: "Competitive Positioning: The Key to Market Success". Prentice Hall, Hemel Hempstead.

HUNT, S.D.; SPARKMAN, R.D.; WILCOX, J.B. 1982: The pretest in survey research: Issues and preliminary findings. *Journal of Marketing Research 19(2)*: 269–73.

HUTT, M.D.; SPEH, T.W. 1992: "Business Marketing Management: A Strategic View of Industrial and Organisational Markets". 4th edition. The Dryden Press, Orlando, Florida.

JACOBY, J. 1984: Perspectives on information overload. *Journal of Consumer Research 10(4)*: 432–5.

JAIN, A.K.; PINSON, C.; RATCHFORD, B. 1982: "Marketing Research: Applications and Problems". John Wiley Ltd, London.

KALAFATIS, S.P. 1983: The marketing of lesser-known tropical hardwoods in the UK. M.Phil. thesis, University of Greenwich.

———1985: Perceptual values and marketing strategies: An analysis of timber products. Ph.D. thesis, University College of North Wales.

———1994: Perceptual position and choice criteria of timber species by UK end-users. Pp.19–40 *in* Proceedings of Forest Products Seminar "Towards an Integrated Theory of Forest Products Marketing", University of Helsinki, Department of Forest Economics, Hyytiälä, 9–12 January.

KELLER, K.L.; STAELIN, R. 1987: Effects of quality and quantity of information on decision effectiveness. *Journal of Consumer Behaviour 14*(2): 200–13.

KOTLER, P. 1991: "Marketing Management: Analysis, Planning, Implementation and Control". 7th edition. Prentice Hall, Hemel Hempstead.

KOTLER, P.; ARMSTRONG, G. 1994: "Principles of Marketing". 6th edition. Prentice Hall International, Englewood Cliffs, New Jersey.

KRUSKAL, J.B. 1964: Multidimensional scaling by optimising goodness of fit of nonmetric hypothesis. *Psychometrika 29(1)*: 1–27.

KRUSKAL, J.B.; WISH, M. 1978: "Multidimensional Scaling". Sage Publications, Beverly Hills.

LAVERS, G.M. 1983: "The Strength Properties of Timber". HMSO, London.

LEVITT, T. 1986: "The Marketing Imagination". The Free Press, New York.

McKEE, D.O. 1992: The effect of using a questionnaire identification code and message about non-response follow-up plans on mail survey response characteristics. *Journal of the Market Research Society 34(2)*: 179–91.

McPHERSON, A.J. 1990: A prime performer. *Timber Trades Journal 352(5900)*: 16–18.

———1992: Market opportunities & strategies for New Zealand grown radiata pine in the UK. Ph.D. thesis, University College of North Wales.

MEYER, C.J.; MICHAEL, J.H.; SINCLAIR, S.A. 1992: The US wood furniture industry: A profile of products and channels of distribution. *Forest Products Journal 42(3)*: 65–70.

MOORE, R.A. 1989: A cross-cultural research project using the mail questionnaire. *The Quarterly Review of Marketing* Spring: 14–17.

MORIARTY, R.T.; REIBSTEIN, D.J. 1986: Benefit segmentation in industrial markets. *Journal of Business Research 14*: 463–86.

MORRIS, M.H. 1992: "Industrial and Organisational Marketing". 2nd edition. Maxwell Macmillan, Don Mills, Ontario.

OPPENHEIMER, A.N. 1993: "Questionnaire Design and Attitude Measurement". Pinter Publishers, London.

PARK, C.W.; JAWORSKI, B.J.; MacINNIS, D.J. 1986: Strategic brand concept-image management. *Journal of Marketing 50(4)*: 135–45.

REEVES, R. 1960: "Reality in Advertising". Knopf, New York.

RIES, A.; TROUT, J. 1981: "Positioning: The Battle for Your Mind". McGraw-Hill, London.

SAUNDERS, J. 1990: Brands and valuations. *International Journal of Advertising 9(2)*: 95–110.

SCHIFFMAN, S.S.; REYNOLDS, M.L.; YOUNG, F.W. 1981: "Introduction to Multidimensional Scaling". Academic Press, New York.

SCHLEGELMILCH, B.; DIAMANTOPOULOS, A. 1991: Prenotification and mail survey response rates. *Journal of the Market Research Society 33(3)*: 243–55.

SEABRIGHT, D. 1990: A comparative study of woodworking machining characteristics of New Zealand *Pinus radiata* and major competing softwoods. B.Sc. dissertation, Buckinghamshire College of Further Education, High Wycombe, UK.

SEATON, R. 1974: Why ratings are better than comparisons. *Journal of Advertising Research 14(1)*: 45–8.

SHEPARD, R.N. 1972: A taxonomy of some principal types of data of multidimensional methods for their analysis. Pp.21–47 in Shepard, R.N.; Romney, A.K.; Nerlove, S. (Ed.) "Multidimensional Scaling: Theory and Applications in the Behavioural Sciences", Vol.1. Seminar Press, New York.

SMITH, S.M. 1988: "PC-MDS Multidimensional Statistics Package". Brigham Young University Press, Provo, Utah.

USDA 1974: Wood handbook: Wood as an e ngineering material. *US Forest Products Laboratory, USDA Agricultural Handbook No. 72.*

WEBSTER, C. 1978: "Timber Selection by Properties: The Species for the Job. Part 1—Windows, Doors, Cladding & Flooring". HMSO, London

WEBSTER, F.E. 1991: "Industrial Marketing Strategy". 3rd edition. John Wiley & Sons, New York.