

The Irish Hardy Nursery Stock Industry: Recent Trends and Competitive Position

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SUMMARY

The Irish Hardy Nursery Stock (HNS) industry has grown considerably in recent times. For the industry to maintain this level of growth it must remain competitive, particularly relative to the UK and the Netherlands, Ireland's main trading partners for HNS. Consequently, the objectives of this research were to (i) establish the size and value of the Irish HNS industry in 1999/2000, and (ii) examine the relative competitiveness of the Irish HNS industry, using profitability and value as indicators of competitiveness.

A census of the Irish HNS industry was carried out between September 2000 and June 2001 to establish the size and value of the industry. The results of the census showed that the net value of plants produced on Irish nurseries amounted to €30.6m in 1999, an increase of €6.8m from €23.4m at the last census in 1996. In the same period the total area devoted to HNS production also increased from 391 ha in 1997 to 465ha in 1999. Kildare remains the most important county in the industry in terms of value because of the large area devoted to outdoor containerised production and production under protection.

In terms of competitiveness, unpaid labour (imputed) had a significant effect on profitability levels for the three countries. When an imputed charge for unpaid labour was included in the analysis, the UK and Ireland had relatively higher Net Nursery Income (NNI) than the Netherlands. However, when the imputed charge for unpaid labour was excluded from the analysis, Ireland and the Netherlands had relatively higher NNI values than the UK.

Firm size and mechanisation levels, were examined as possible sources of inter-firm variations in costs of production and profits. Economies of scale appeared to be evident as nursery size increased from 'small' to 'medium' and dissipated as nursery size increased from 'medium' to 'large'. This indicated that the minimum economic size for HNS production appeared to be relatively low. Based on the observed relationship between labour productivity and mechanisation levels, it is possible to infer that future mechanisation of the Irish industry may provide a partial solution to labour availability problems.

Although the Irish HNS industry showed a competitive cost advantage, the low added value content of the Irish product is not a reassuring sign for the industry. The research revealed that the *competitive potential* of the industry in the Netherlands, based on relative value-added properties, was ahead of the Irish and UK industries. However, the Netherlands has not fully succeeded in converting this *potential* into *competitive performance* in the Irish market for HNS. The Irish HNS industry remains the largest supplier of HNS to the domestic market, although HNS available from the Netherlands was seen as given better value.

In order for the Irish industry to remain competitive in the future the competitive strategies which the industry adopts must be re-evaluated. Distinct market segments were observed in the Irish market, which offers potential for a *focused* competitive strategy, which may suit smaller specialist producers. The critical buying criteria identified and subsequent relative performance of the Irish industry should provide the information, which is required for a competitive strategy of *differentiation*.

Introduction

This report contains the results of two analyses:

1. An analysis of the relative size and value of the Irish HNS industry in 1999/2000.
2. An analysis of the competitiveness of the Irish HNS industry relative to its main trading partners.

Census of the Irish HNS, 1999/2000

Objective

The purpose of this research was to establish the size and value of the Irish Hardy Nursery Stock (HNS) industry in 1999/2000.

Data Source

A census of the HNS industry was carried out between September 2000 and June 2001. The census was the third in the recent series initiated by the Department of Agriculture and Food in 1994 (Maher *et al.*, 1999, Maher *et al.*, 2001). It is planned to carry out the exercise every three years in order to provide on-going statistics on the development of the industry.

The 2000/2001 census was planned by the Department of Agriculture, Food and Rural Development, Teagasc, An Bord Glas and the Irish HNS Association. Most of the information sought in the questionnaire was similar to that in the 1997/98 census, to facilitate comparison between the years. All significant HNS producers were included in the census. The data were collected from the individual nurseries by the Plant Health Inspectors of the Department of Agriculture and Food. Completed forms were received from 222 nurseries compared with 226 in 1997 and 214 in 1994.

Results

Total sales of produce during 1999, amounted to €36.0m. However €5.4m of this total were classified as immediate resales. Therefore, the net value of plants produced on the nurseries was €30.6m in 1999. This represented a 28% increase in value since the previous census, when net sales for 1996 were €23.8m.

The total area devoted to HNS production also increased since the 1997 census from 391 ha to 465 ha. The area for field, container and protected production in the counties, with the number of nurseries and the net value for the industry are shown in Table 1.

Table 1 Number of nurseries, production area (ha) and value by county, 1999

County	Number of nurseries	Outdoor production		Area under protection	Net Sales (€'000)
		Field	Container		
Kildare	25	32.0	31.1	10.0	7.5
Cork	31	57.4	6.6	6.0	4.4
Tipperary	17	129.8	13.2	2.3	4.4
Dublin	19	11.0	8.1	4.3	2.6
Kilkenny	10	1.6	7.2	2.3	2.0
Waterford	7	23.2	7.1	3.1	1.6
Limerick	14	4.5	4.8	1.2	1.2
Westmeath	10	0.7	5.0	1.4	1.0
Wicklow	11	21.8	3.6	1.4	0.80
Other	78	21.7	33.3	9.4	5.1
Total	222	303.7	120.0	41.4	30.6

Table 1 shows that Kildare is the most important county in the industry in terms of value because of the large area devoted to outdoor containerised production and also cropping under protection. Tipperary is another important region, especially in terms of field production and it is also the second largest area of outdoor container beds. Cork has increased in importance since the 1997/98 census.

Further information from the 1999/2000 census, on topics such as production areas, value of different plant types, employment and productivity, other business activities, imports and exports and barriers to expansion, can be obtained from Maher *et al.*, (2001).

Competitiveness of the Irish HNS Industry

Introduction

The Irish HNS industry has grown significantly in recent years (Maher *et al.*, 2001) and if it is to maintain this growth in the future it must be competitive. Competitiveness may be defined as the "*ability of a business to profitably create and deliver value at prices equal to or lower than those offered by other sellers in a specific market*" (Harrison and Kennedy, 1997, p.16).

Objective

The overall objective of this research was to examine the relative competitiveness of the Irish HNS industry. Based on Harrison and Kennedy's (1997) definition of competitiveness, two specific objectives for this research were identified as the examination of the relative (i) **profitability** and (ii) **value**, of Irish HNS, compared to the UK and the Netherlands, Ireland's main trading partners for HNS (Maher *et al.*, 2001).

Methodology

Relative Profitability

Total revenue, costs of production and Net Nursery Income (NNI) per 100 square metres of HNS production.

The traditional focus in agricultural competitiveness research has been on production costs per tonne of product (Boyle, 2002). As HNS production consists of the production of a wide variety of different product lines, it was decided that the most appropriate measure was per area of production, rather than per tonne.

Costs and NNI as a percent of total revenue.

Research examining the relative efficiency of horticultural production, as opposed to agricultural production, quite often examines costs based as a percent of the value of output, in order to take product returns into account (Crane and Barahona, 1996 and George, 2001). Accordingly, costs of production and NNI were examined as *a percent of total output*.

Factors which influence relative cost based indicators of competitiveness.

To provide actionable and meaningful conclusions and recommendations it was necessary to examine possible reasons for variation amongst firms in cost based indicators of competitiveness. Firm size and mechanisation level were studied as two possible sources of variation in cost based indicators of competitiveness.

Data Sources

Information on costs of production and profitability was available for the UK (Crane and Barahona, 1996) and the Netherlands (Farm Accountancy Data Network, 2000) but not for Ireland. The data reported in Crane and Barahona (1996) for the UK refers to the 1996 accounting year; consequently, it was necessary to adjust the data to reflect production in 1999. Estimates from the UK Department for Environment, Food and Rural Affairs (Vaughan and Crane, 2000) provided the basis for calculating the 1999 data. Output values were updated using the producer price index for flowers and plants. Costs of production values were updated using the means of production price index.

The data on Irish costs and profitability were obtained from a survey of HNS producers. An initial sample of seventy producers from the population of 226 (Maher *et al.*, 1999) was selected. The sample selection was based on location and specific size groupings. Turnover (sales) was used as the measure of size. All nurseries with sales greater than € 253,948

(IR£200,000) (classified as "large nurseries") were surveyed. For the remaining four turnover categories¹ selection was based on the respective contributions of each group to total industry turnover.

The response rate was 76 percent (53 out of 70). It was not possible to replace the 17 cases which did not take part in the survey due to the limited number of cases in the specified categories. The results obtained from the sample were weighted to represent the population.

The survey used interview questionnaires which examined sales levels, variable costs, fixed costs, net nursery income and mechanisation levels.

Relative Value

The techniques used to determine the relative value-added properties of HNS from the three countries were (i) attribute rating; (ii) cluster analysis and (iii) conjoint analysis.

1. Attribute rating

The Attribute Rating Method (ARM) is a technique for estimating the benefits derived by consumers. The purpose of this technique was to determine (i) the attributes of HNS that are important to buyers in the market, and (ii) how Irish producers are currently positioned in the market relative to the UK and the Netherlands in terms of these attributes.

The ARM of total benefit estimation was completed in three stages. (1) Each buyer was initially asked to allocate an importance score to a list of buying criteria. The criteria were quality of HNS, range of HNS provided by the supplier, delivery service, overall service, promotional materials, availability, labelling, easy ordering and price. This list of buying criteria was compiled based on qualitative research with a number of key informant buyers of HNS in the Irish market. (2) Subsequently, each buyer in the survey was asked to assign a performance rating to each criterion, for each of the countries of origin where HNS was sourced. (3) "*Relative perceived benefits*" were then calculated for each of the countries of origin, by multiplying the importance weight by the performance rating for each of the buying criteria. This total benefit estimation was used as an indicator of the *competitive potential*² of the HNS firms competing on the Irish market.

1. Cluster Analysis

Cluster Analysis attempts to classify members of a given data set into categories by minimising the variation within clusters and maximising the variation between clusters. Cluster analysis was used in this research to identify distinct clusters of buyers of HNS within the Irish market.

2. Conjoint analysis

Conjoint analysis is a technique, which estimates the relative benefits of different product attributes and preferences for alternative attribute levels (Green and Srinivasan, 1990). The attributes specified in conjoint analysis in this research were (i) country of origin and (ii) price. The attribute levels for country of origin were Ireland, the UK and the Netherlands and for price were a representative low, medium and high price. Separate conjoint analysis techniques were specified in this research for three separate HNS products: *Viburnum davidii*, *Thuja occidentalis* 'Rheingold' and *Betula utilis* var. *jacquemontii*.

Based on the relative benefits obtained from this exercise, for both price and country of origin, it was possible to determine (i) the relative importance of price and non-price attributes in the determination of competitiveness of HNS. Furthermore, based on the buyers preferences for alternative attribute levels, it was possible to determine (ii) the buyers preferences for HNS sourced from Ireland, the UK and the Netherlands, which provided data for estimation of relative market share of the HNS market. Market share is assumed to be an indicator of *competitive performance*³ in this research.

Data Source

A survey of buyers on the Irish market. The survey was based in the Irish market because produce from the UK and the Netherlands compete directly with Irish produce in this market. A total of 71 buyers from a population of 154 were surveyed.

Results and Discussion

Relative Profitability of HNS Production

The relative profitability of HNS production, for Ireland, the UK and the Netherlands are presented in Tables 2 and 3 below.

Table 2 Revenue, Costs of Production & Net Nursery Income per 100 square metres of UNA in Ireland, UK and the Netherlands (1999)			
	Ireland	UK	Netherlands
	€'s per 100 square metres		
Revenue	764	567	600
Costs			
Liners & Young Plants	138	57	70
Fertiliser, Peat & Chemicals	46	34	14
Other Variable Costs	99	91	35
Labour Costs ⁴	336	272	328
Other Fixed Costs	153	119	218
Net Nursery Income	-8	-6	-65

Table 3 NNI as a % of Revenue for Ireland, UK and the Netherlands (1999)			
	Ireland	UK	Netherlands
1. Value of output	100	100	100
2. Liners & Young Plants	18	10	12
3. Fertiliser, Peat & Chemicals	6	6	2
4. Other Variable Costs	13	16	6
5. Total Variable Costs (2+3+4)	37	32	20
6. Gross Margin (1-5)	63	68	80
7. Labour ¹¹	44	48	55
8. Other Fixed Costs	20	21	36
9. Total Fixed Costs (7+8)	64	69	91
10. Total Costs (5+7+8)	101	101	111
11. NNI (1-10)	-1	-1	-11

Tables 2 and 3 above show all three countries had a negative NNI when expressed per 100 square metres of UNA and as a per cent of total revenue. However, due to the imputed charges for unpaid labour included in this analysis, a negative NNI does not necessarily translate into a cash loss in real terms. The inclusion of an imputed charge for unpaid family labour was important in this analysis as it allowed direct comparison of the smaller family run units, which rely heavily on family labour, with the larger intensive units which are reliant on paid labour. On a total economic cost basis⁵, Ireland and the UK appeared to have a more favourable NNI, than the Netherlands. The NNI position in the three countries, based on a cash cost approach (i.e. without an imputed charge for unpaid family labour) is shown in Figure 1 below.

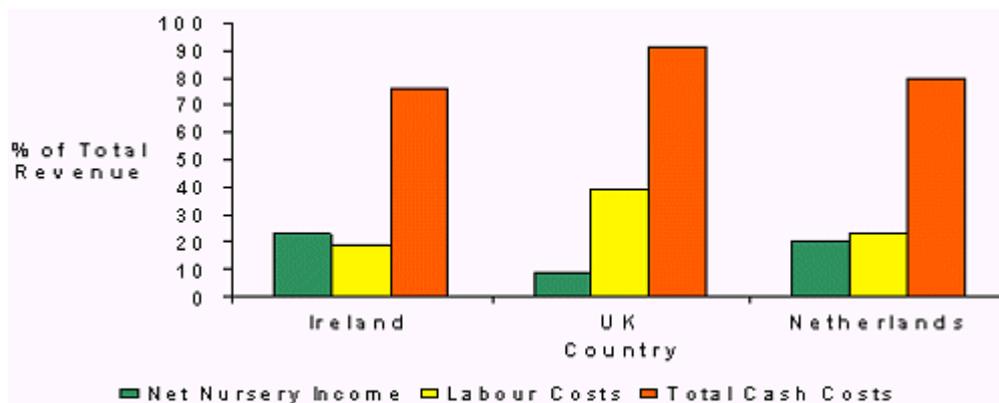


Figure 1 NNI, Labour Costs and Total Cash Costs (before deduction of imputed charges for unpaid labour) as a Percent of Total Revenue in Ireland, the UK and the Netherlands (1999)

Figure 1 shows that NNI, as a percent of total revenue, was altered dramatically when imputed charges for unpaid labour were removed from the calculation. Ignoring the cost of unpaid family labour, NNI as a percent of total revenue is highest in Ireland, followed closely by the Netherlands and is lowest in the UK.

All of the data presented so far show industry averages. However, the HNS industries in the three countries consist of nurseries which vary enormously in terms of size and turnover. Consequently, to get a better understanding of how industry structure affects profitability levels, the individual nurseries were classified into three size categories (Figure 2) based on a review of relevant literature (Maher et al., (1999), Crane and Barahona (1995), FADN (2000)). The three industries were categorised into three distinct categories, appropriate to the respective industries⁶.

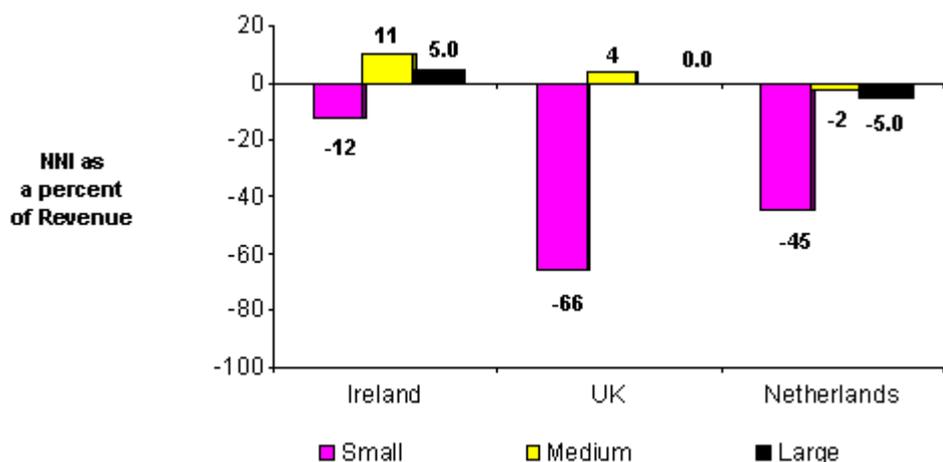


Figure 2 Comparative NNI by Nursery Size, 1999

Figure 2 shows that profitability increased as nursery size increased from small to medium but did not continue into 'large' nurseries. This shows that the minimum economic size for the industries is relatively low, suggesting a continuation of its present fragmented structure.

In addition to nursery size, mechanisation levels were examined as a possible factor which influences costs and profitability levels on Irish nurseries in particular. The obvious area where mechanisation levels can positively affect the performance on nurseries is labour productivity. Accordingly, when the relationship between labour productivity and mechanisation levels was investigated, a significant positive correlation was found between the two variables. Nurseries that had invested in mechanisation had high labour productivity. This indicates that if labour costs rise, automation of the industry may provide an opportunity for cost reduction, by increasing labour productivity. However, one must note that 67 percent

($r^2 = .3259$) of the variation in labour productivity remains unexplained by mechanisation levels.

Relative Value

Attribute Rating Method of Benefit Estimation

The attribute rating method of benefit estimation was completed in three stages. Initially the buyers were asked to allocate an importance score of between 1 and 10 to a list of buying criteria (Figure 3).

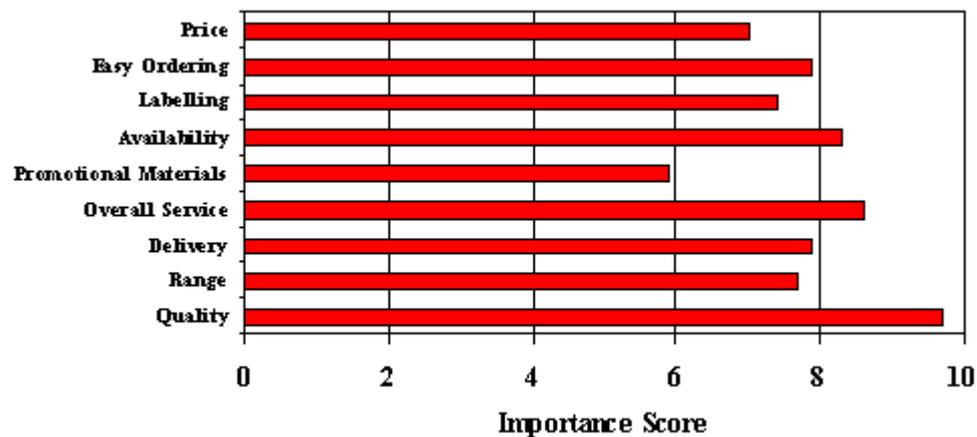


Figure 3 shows that although all of the buying criteria were considered important, some factors were more important than others. Quality was classified as the most important factor in the buying of HNS. The importance of quality in the supplier selection process is consistent with past studies (Webber, 1991; Verma and Pullman, 1998). Promotional materials were assigned the lowest score in the buying process. Price, labelling, range, easy ordering and delivery all had an importance score between 7 and 8. Price was traditionally assumed to represent one of the most important items determining competitive position of the HNS industry (Hack *et al.*, 1992) but this analysis does not give major importance to price.

Further to this analysis, buyers completed stage 2 of the attribute rating exercise which required respondents to allocate a performance score on each of the criteria, for each of the three competing countries (Figure 4). Figure 4 shows the performance scores, for each of the buying criteria to each of the countries, which was based on a performance scale of between 1-10, where 1 was poor and 10 was excellent.

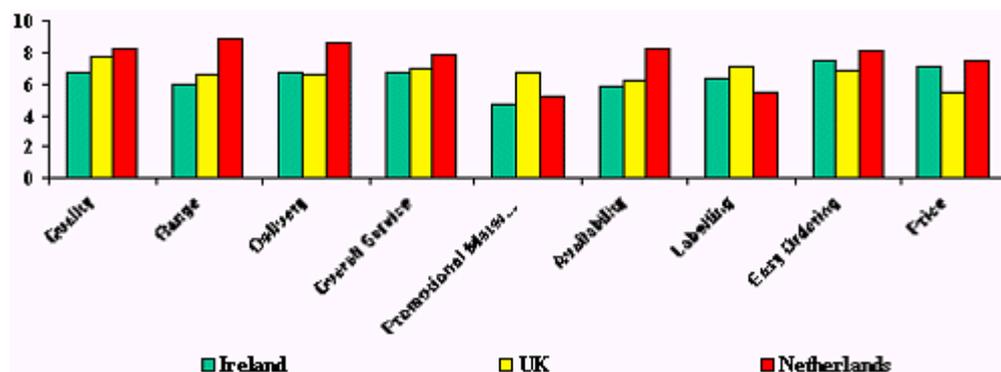


Figure 4 Performance Score of Critical Buying Criteria in Ireland, the UK and the Netherlands

Figure 4 shows that in 7 out of the 9 buying criteria, HNS sourced from the Netherlands received a higher score than material from Irish or UK nurseries. UK nurseries received the

highest performance score for promotional materials and labelling. Irish nurseries only managed to outperform their counterparts in the Netherlands for plant labelling.

Stage 3 involved computing *weighted* performance scores for each of the industries to provide "relative perceived benefits" (Figure 5). The importance scores in stage 1 provided the weights, and the performance scores in stage 2 provided the benefit estimations.

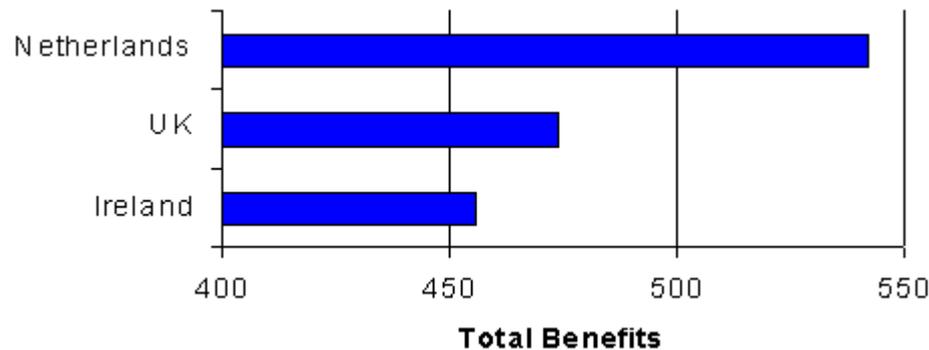


Figure 5 Total Benefit Estimation – Indicator of Competitive Potential

Figure 6 shows that the relative perceived benefits of HNS sourced in the Netherlands is higher than HNS sourced in UK or Irish nurseries. Based on this simple method of comparison, the Netherlands industry was perceived to offer higher overall benefits to Irish buyers, relative to UK or Irish suppliers. This method of benefit estimation is assumed to represent the *competitive potential* of HNS producers in Ireland, the UK and the Netherlands, as determined by the Irish HNS market. It is important to note that *competitive potential* does not automatically infer *competitive performance*. Intention to purchase is a more realistic view of market performance and this issue is investigated by the conjoint analysis technique.

Cluster Analysis

Cluster analysis was used to determine if distinct market segments existed in the Irish market for HNS. The variables upon which the cluster analysis was based were the importance scores for the critical buying criteria, referred to in the benefit estimation above. Figure 6 shows the results of the nine cluster solution.

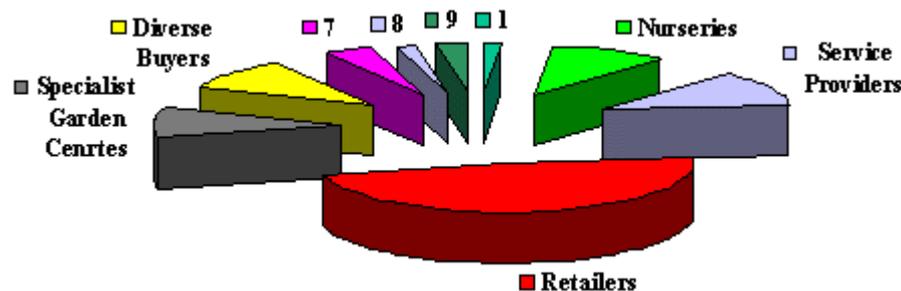


Figure 6 Market Segments of the Irish HNS Market (2000)

Figure 6 shows that 4 of the clusters identified in the 9 cluster solution, had relatively few cases and as such were classified as outliers and omitted from future analysis. The **nurseries** identified believed that quality was the most important factor in the selection process, followed closely by price and range. Labelling and promotional materials were relatively less important factors for nurseries in the selection process. The **service providers** also cited quality as the most important determining factor in the selection process of HNS suppliers but also considered easy ordering, delivery, overall service and availability to be important variables determining the selection of HNS suppliers. The **retail**

centres weighted the various buying criteria very evenly in the selection process, which identified this cluster as the most demanding market segment with respect to the specified buying criteria. The **specialist garden centres** were predominately smaller family run garden centres, which again considered quality to be the most important buying criteria. Price, range and availability were not as important to members of this cluster as they were to the previous cluster. The **diverse buyers** which consisted of nurseries and smaller garden centres also identified quality as the most important factor determining the purchase of HNS. Labelling and price were also important buying criteria, whereas promotional materials were not considered important for this market segment.

The results from this cluster analysis show that the Irish HNS market is not a homogeneous market but instead, consists of a number of distinct market segments, with individual needs and preferences.

Conjoint Analysis

The rationale for completing the conjoint analysis was (i) to determine the importance of price versus non-price attributes and (ii) the competitive *performance* of Irish HNS on the Irish market. Figure 8 below shows the importance of price and non-price attributes (country of origin) in the determination of competitiveness of HNS production.

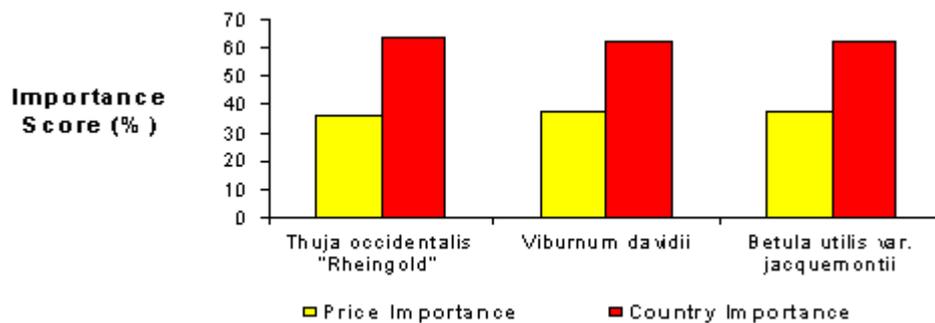


Figure 7 Average Importance Scores for Price and Country of Origin

Figure 7 shows that for each of three conjoint analysis product exercises, non-price attributes (as represented by country of origin) were considered more important than price attributes. These data show that HNS is not commodity product, which assigns paramount importance to price attributes in the determination of competitiveness, but rather a differentiated primary product which assigns a weighted bias towards non-price attributes in the determination of competitiveness.

Figure 8 below shows the preferences for the country of origin attribute levels specified in each of the three conjoint analyses exercises.

Figure 8 shows that most buyers preferred to source HNS from Irish suppliers. The Netherlands was the second most preferred country of origin and the UK was the least preferred country of origin. This result is consistent with previous studies which have investigated country of origin preferences and illustrated that respondents prefer products made in their home country first and foremost (Okechuku, 1994; Nagashima, 1970; Kaynak and Cavusgil, 1983).

The data from Figure 8 was used in the simulation of market share data for the domestic market, assuming that Ireland, the Netherlands and the UK are the only three suppliers and the relative importance of the three HNS products was based on information gathered in the census. Figure 9 below shows the simulated market share data obtained from the conjoint analysis exercises.

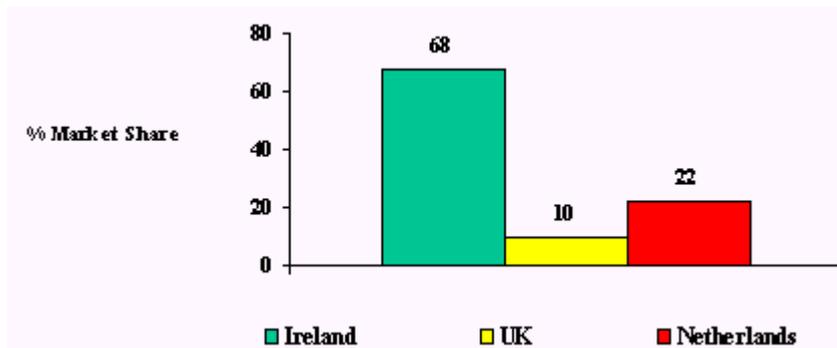


Figure 9 Market Share of the Irish HNS Market – Indicator of Competitive Performance (2000)

Figure 9 shows that Ireland continues to maintain high market share on the domestic market, despite the relatively high-perceived total benefits offered by the industry in the Netherlands.

Conclusions

The Irish HNS industry has grown significantly in recent years and if it is to maintain this growth it must be competitive. Based on Harrison and Kennedy's definition of competitiveness, relative profitability and value were identified as relevant indicators of competitiveness.

A comparison of survey-based cost data between the three countries showed that there were differences between countries in revenue, costs and NNI, per 100 square metres of UNA and as a percent of total revenue. Unpaid labour (imputed) had a significant effect on NNI for the three countries, when examined as a percentage of total revenue. When imputed charges for unpaid labour were included in the analysis, the UK and Ireland had relatively higher NNI than the Netherlands. However, when imputed charges for unpaid labour were excluded from the analysis, Ireland and the Netherlands had relatively higher NNI values than the UK. Based on this analysis, it appears that unpaid labour is more common in nurseries in the Netherlands, compared to Ireland and the UK. Also nurseries in the UK had the highest paid labour costs in 1999, followed by the Netherlands and Ireland.

In order for the recommendations of this study to be practical, it was important that possible sources of inter-firm variations in costs of production and profits were examined. This focused on firm size and mechanisation. Based on firm size the minimum economic size for HNS production appeared to be relatively low, which suggests a continuation of the fragmented structure of the three HNS industries. Based on the observed relationship between labour productivity and mechanisation levels, it is possible to infer that future mechanisation of the Irish industry may improve labour productivity.

Despite the fact that the Irish HNS industry has illustrated a competitive cost advantage, the relatively low value-added properties of Irish HNS is not a reassuring sign for the industry. The ARM method of benefit estimation showed that the *competitive potential* of the industry in the Netherlands, based on relative value-added properties, was ahead of the Irish and UK industries. However, the Netherlands has not fully succeeded in converting this *potential* into *competitive performance* in the Irish market for HNS.

The *competitive potential* of the Netherlands may be regarded as a threat to the Irish industry and must be understood if domestic performance of the Irish industry is not to be lost to nursery producers in the Netherlands. In order for the Irish industry to remain competitive in the future, the competitive strategies, which the industry adopts must be re-evaluated. In the price versus non-price trade-off in the market for HNS products, price was determined to be a less important attribute than non-price factors. Based on this information it is apparent that competitive strategies which focus on non-price attributes are most appropriate for this industry. Therefore, competitive strategies of *differentiation* and *focus*

must be considered to be appropriate for the Irish HNS industry in the future. Distinct niche market segments were observed in the Irish market which offers potential for a *focus* competitive strategy, which may suit smaller specialist producers. The critical buying criteria identified in the ARM and subsequent relative performance of the Irish industry may provide critical information, which could form the basis of a competitive strategy of *differentiation*.

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Associated Publications

Thorne, F, Kelly, P., Maher. M and Harte, L. (2000) `Competitiveness of the Irish Hardy Nursery Stock Industry', *Proceedings of the Open Day at Kinsealy Research Centre*, October 2000.

Thorne, F, Kelly, P., Maher. M and Harte, L. (2000) `Costs of Production of the Irish Hardy Nursery Stock Industry', *Proceedings of the Teagasc Hardy Nursery Stock Conference*, 17th November 2000.

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Footnotes

¹ <€63,487 (IR£50,000); €63,478 - €126,974 (IR£50,000 - IR£100,000); €126,974 - €190,461 (IR£100,000 - IR£150,000); €190,461-253,948 (IR£150,000 - IR£200,000)

² Competitive potential is a measure of sources of competitiveness (Buckley et al., 1988).

³ Competitive performance is an indicator of competitive position (Buckley et al., 1988).

⁴ Labour Costs include an imputed charge for unpaid labour. Based on this calculation all costs referred to in Tables 4 and 5 represent total economic costs rather than cash costs.

⁵ Total economic costs in this research refers to the inclusion of imputed charges for unpaid family labour.

⁶ The Irish industry has three categories based on nursery sales <€63,487 (IR£50,000) = small, €63,487 (IR£50,000) to €253,948 (IR£200,000) = medium and > €253,948 (IR£200,000) = large. The UK industry has three categories based on nursery sales <£40,000 = small, £40,000 to £200,000 = medium and >£200,000 = large. The Netherlands industry has three categories based on size units <185 standard farm units = small, 185 standard farm units to 285 standard farm units = medium and >= 285 standard farm units = large.