

How do Small Companies Measure Their Performance?

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Abstract

This study reports the results of questionnaire surveys with companies that hire less than 20 employees in Finland the UK on how performance be measured. The results are: First, both the Finnish and UK companies rely on employees, production lines and activities to formulate their performance measurement system. Second, both the Finnish and UK companies use both the financial and non-financial variables to measure their performance despite the UK companies tend to emphasise more on the financial variables. Third, factor analysis shows that environmental and non-human production factors play a major part on the performance of these small companies. The results make major contributions to the business community and managers in decision-making processes. Future research could expand the sample size and include other methods of capturing data for analysis.

Key words: performance measurements, small companies, questionnaire surveys, financial and non-financial variables.

JEL Classifications: M1, M4, M41.

1. Introduction

This paper reports the results of a questionnaire survey on how performance was measured by owners-managers of small companies in Finland and the UK. The questionnaires were sent to 156 small companies in Finland (27 responded or 17.3%) and 30 in the UK (10 responded or 33%). Small companies are the target for the study due to much of the prior performance research focused on large manufacturing companies (Gates, 1999; Frigo & Krumwiede, 2002). For example, Malina & Selto (2004) conduct a case study on a large US Fortune 500 manufacturing company, Drury & Taylor (1993) report a survey on 260 UK manufacturing companies while Andersin, Karjalainen & Laakso (1994) survey 82 Finnish (metal) manufacturing companies. These studies show that large organisations use both financial and non-financial variables for measuring performance, making decisions and formulating strategies (Malina & Selto, 2004: 441) and base on format of the Balanced Scorecard (BSC) formulated by Kaplan and Norton (1992). BSC consists of four perspectives (innovation & learning; internal business; customer perspective; and financial perspective). The BSC is useful for large organisations and this study is based on the integrated performance measurement system (IPMS) designed by Laitinen (2002). The IPSM aims to target for measuring performance of small companies that include both the financial and non-financial variables. The system comprises seven factors and a causal chain between these. The factors are divided into two external factors (financial performance and competitiveness) and five internal factors (costs; production factors; activities; products and revenues). The causal chain between the factors (the strategic map) follows the logic of resource allocation in the company (refer to Laitinen, 2002 for details).

The IPMS counteracts the traditional approach of over-emphasizing financial performance while stipulating the needs to evaluate the sources of costs and benefits that the resources were allocated and derived. Financial measurements are based on short-term returns, suffered from lack of strategic focus, led to local optimisation, and managers attempt to minimize variances (Neely, 1999: 206). In today's competitive environment, organizations need to consider non-financial variables including production efficiency, efficiencies of activities, quality of products and services, reliability, flexibility and delivery performance (Drury, 1990: 41), profitability, competitiveness, financial performance and impacts on environment (Laitinen, 2002: 66) to balance the needs and expectations of different groups of stakeholders while projecting good citizenships.

As far as manufacturing companies are concerned, Maskell (1989: 33) reports that many managers and external users prefer non-financial variables than financial variables since the former are clearer and more relevant to the manufacturing companies (Bromwich and Bhimani, 1994: 243; and Horngren, 1995: 285). In fact, challenges faced by manufacturing companies to formulate appropriate measuring indicators are similar to their smaller counterparts (Smith, 1994: 234). Berry (1998: 43) argues that size of a company should not be the main concern for differentiating their approach on measuring performance. In fact, BSC is designed for large corporations but this does not mean that it is not applicable to small businesses (Birch, 1998: 43).

Despite this, there is a lack of study on how small and medium sized companies measure their performance (Perren & Grant, 2000). Small and medium sized companies have inherited challenges on availability of resources and owners' perception of the needs for successful and reliable measuring indicator(s). Owners and managers of small companies aware of the importance of having adequate cash flow for survival but many do not appreciate the importance of measuring the returns. Efficiency and effectiveness in the usage of limited resources should be equally, if not, more important than the cash balance.

Prior research focuses on how small and medium sized companies measure their performance. For example, Davig, Elbert & Brown (2004) adapted BSC to survey small manufacturing companies with less than 250 employees. There is no known prior study on how companies with less than 20 employees conduct their performance measurements. This study intends to fill the void. Small companies make up of more than 90% of the business population and contribute nearly two thirds of the national employment in the UK (Mitchell & Reid, 2000: 385). This situation is quite similar in Finland where only 7635 (or 3.4%) of the total 224,847 registered companies employed more than 20 employees (Statistics Finland, 2002)¹. The number of small companies in both countries is on the increase and their contributions to the society and economy are increasing in importance and proportion (Gates, 1999; and Frigo & Krumwiede, 2002). However, due to the small sample size, results of this study should be considered as preliminary and be interpreted with care. Factor analysis will be used to identify for dimensions in the measurements based on the extracted factor scores. The paper is divided into four sections. The introductory section presents the background and motivation to the study. The attributes to the performance measurement are discussed in the second section in the light of Laitinen's IPMS. The empirical sample and methodology are presented in section three, while the final section presents a short summary, limitations of the study and areas for further research.

2. Attributes of Performance Measurement

Over the decades, organizations have used a portfolio of financial variables to measure performance (see for example Khandwalla, 1972). Recent findings seem to reveal that organizations have opted for both financial and non-financial variables in the measuring process (for example, Chenhall, 2003; Anderson & Young, 1999; Luft & Shields, 2003). In some cases, organizations adopt a broader dichotomy, for example high versus low environmental uncertainty and old versus new technological approach (see Chenhall, 2003). There are some studies that reveal organizations merely adopting financial variables while discarding the non-financial variables in the measuring process due to managers constantly aim to maximize the shareholders' wealth (for example, Zimmerman, 1997: 187; Adimando et al., 1994; Rappaport, 1999). On reflections on contributions of performance measurements, Malina and Selto (2004: 443) dismiss the prior studies and models as "... these (financial) models do focus primarily on financial outcomes, they do not qualify as systems models; that is, they do not model the determinants of financial performance even within the boundaries of the firm". The "boundaries of the firm" could mean that modern organizations are responsible to a wider range of stakeholders apart from shareholders. These include customers,

¹ See http://www.stat.fi/tup/suoluk/taskue_yritykset.html.

employees and the general public. Survival of modern organizations depends on the extent of duties of care and corporate governance. The boundary for non-financial variables has now extended. Kaplan and Norton's (1996, 2001) BSC recommends organizations to look beyond the financial perspective and include the customer (for example number of complaints, percentage of repeated orders), internal business (for example throughput time, rework and wastage in processing) and innovative and learning (for example, number of new products, investments in R&D) perspectives in the measuring processes. However, Ittner and Lacker's (2001) approach on value-based management approach and Kanji's business scorecard attempts to link business decisions and outcomes (Kanji and Moura e Sa, 2002). In fact, these models attempt to include "operational, strategic, financial and non-financial performance" in the measuring processes (Malina and Selto, 2004: 443). The above boundaries are extension of Laitinen's (2002) IPMS whereby measurements could be broadly divided into internal and external factors. The internal factors include costs; production factors; efficiency of activities; properties of products; revenue; competitiveness; and financial performance while the external factors include cost allocation, attending to production factors and properties of the product. The following subsections discuss briefly each of the variables and their implications to measuring performance of an organisation. All these factors are inter-related by a causal link based on the flow of resources within the organization.

Costs

This relates to the traditional approach on budgeting and cost accounting. Costs of producing an item or offering the services would be the main determinant for pricing, profit margins and for other decision making process. Thus, cost is an important variable to the survival of an organization. In this framework, costs are classified by production factors.

Production factors

At this stage, it is important to evaluate how costs are efficiently allocated to production factors. These factors relate to the extent of how the spaces were allocated, and machines and employees were utilised. Organisations should ensure that employees are properly motivated and rewarded to reduce wastage. Resources allocated should be properly accountable for and measured.

Efficiency of activities

Production factors are used to perform activities. The factors intend to evaluate efficiency of the organisation in delivering its products and services and the costs involved. Quality of services to customers is included in the measurement. In summary, activities are measured through three dimensions: time, cost, and quality.

Properties of products

The organisation uses activities to produce and develop products. This factor is an extension of the above factors whereby organisations normally match the amount of resources allocated to the level of satisfaction from the customers. The measurements include the amount and extent of resources allocated for the new products, level of customers' satisfactions and modifications needed for existing products and services.

Product and customer profitability

Products are sold to customers at a price that should provide organisations with sufficient profitability, normally based on profitability ratios. Profitability measures would help set the strategy and operational decisions of the management.

Competitiveness

Products and customers are important determinants of competitiveness. External factors have a strong impact on the survival and growth of an organisation particularly in small and medium-sized organisations. The rate of growth in revenue and its market size could determine returns and performance of the organisations

Financial

Financial performance is largely based on product and customer profitability but also on competitiveness. Various ratios including profitability, liquidity and gearing could be computed as the basis to measure returns on investments and performance. Financial results would be a relatively straightforward measurement comparing to those non-financial variables. However, managers should be aware of limitations of the financial data and many of these are based on estimations and judgment.

Environmental effects

Products and production itself may have environmental effects. Environmental factors have become important and sensitive issues to consumers. Consumers tend to opt for products that are eco-friendly and recyclable. Demand for items that are deemed harmful to the environment has become less attractive to consumers. Stakeholders are aware of the growing concern on the green issues and how organisations protect and prevent environmental disasters to its surroundings have become important issues in our modern society.

3. Data and Methods

The empirical data for the present study was gathered from Finland and the UK. Finland and the UK are very different kinds of countries, which makes the comparisons interesting. Although Finland is a small country, it has invested a lot in R&D and innovation¹. When comparing Finland and the UK, the Finnish economy has grown much rapidly over the last few years and had lower (especially short-term) interest and inflation rates. In 2003, the annual change in industrial output was 5% in Finland but -2.2% in the UK. The short-term interest rate in that year was 2.3% in Finland while 3.7% in the UK. Finally, the consumer price index in 2002 (1990 = 100) was 126.0 in Finland in comparison to 139.7 in the UK. Thus, apart from cultural differences, organisations in these two countries face a different level of economic challenges².

In Finland, the sampling was based on the database (Voitto Plus) managed by Finska³. This database includes public information from more than 80,000 Finnish companies that makes at least 40% of all companies in Finland. The questionnaire was posted on web pages so that the sample was restricted on small companies that have their own web sites. When the size of the sample companies was restricted to be below 20 employees, 156 such companies were found fulfilling the criteria set for the sample. The questionnaire was sent by email to the companies and 27 responses (17.3%) were obtained. There was no observable sample bias when the size and industry of the responded companies were compared with the population. The companies in the sample represent all kinds of industries including companies from manufacturing, trade, service, and constructing industries. However, more than half of the companies are manufacturing companies (55%). In addition, 30% of the sample companies belong to the service industry while the proportion of trade and constructing companies are only 12% and 3%, respectively.

The UK sample was extracted from the database kept by Center for Economic Development and Research (CEDAR) based in Southampton⁴. The database contains financial and non-financial details of over 5,000 small companies registered in the South and South East of England. Nature of activities ranges from constructions (388 of them), manufacturing (581), consultancy (177) and wholesales distributions (92), and others⁵. Questionnaires were sent to 30 randomly selected companies and received 10 responses (33%). The content of the UK questionnaire is similar to the Fin-

¹ See <http://virtual.finland.fi/Economy/>.

² For national cultures see Hofstede (1994).

³ For Finska (Suomen Asiakastieto Oy) see <http://www.asiakastieto.fi>

⁴ CEDAR collects information of small businesses in the South and South East of England. The database contains details of 5631 companies with a variety of activities from construction (388), manufacturing (581), consultancy services (177) and others. Interested readers could request for information from www.solent.ac.uk

⁵ It is difficult to ascertain the exact amount of contributions by these small companies to the local and national economy in the UK.

nish version¹ to enhance comparability. Each questionnaire consists of two main sections. First, background information to establish characteristics such as size (number of employees), export (proportion of export in turnover), R&D (proportion of turnover invested in R&D) and performance (average five-year growth in turnover and return on investment) of the respondents. Second, information was gathered about a couple of contingency variables that may affect performance measurement systems. This information deals with organizational capacity to learn, competition, strategy, and uncertainty that all are relevant contingency variables in this context (see Libby & Waterhouse, 1996; and Mia & Clarke, 1999).

Capacity to learn is measured by the number and proportion of employees working on financial and administrative tasks. Respondents are requested to assess competition based on a five-point Likert scale. Strategy assessment is based on mapping the importance of five success factors (high quality, low price, short delivery time, on time delivery, and elasticity) and a perceived typology of strategic behaviour (prospecter, defender, and analyser)². Any uncertainty is evaluated on the basis of the perceived ability of the respondents to predict changes in seven areas of their business activities (own company, products, behaviour of the competitors, taste and behaviour of the customers, development of technology, availability of competent employees, and the price level of products). In both strategy and uncertainty are evaluated on a five-point Likert scale.

Changes in the performance measurement systems are quantitatively analysed on a five-point Likert scale assessed at five different organizational levels (individual employees, teams or production cells, activities and processes, profit or cost centres, and at the level of the firm). The objects for performance measurement are classified into 8 classes and 24 objects. The classes are cost structure (1 object), production factors (7 objects), efficiency of activities (3 objects), properties of products (4 objects), product and customer profitability (2 objects), competitiveness (2 objects), financial performance (2 objects), and environmental effects (2 objects). The classification is based on Laitinen's (2002) IPSM framework.

All the statistical calculations are run by the SPSS. Differences between the nominal variables are evaluated by cross tabulation and tested by the χ^2 statistic. The differences between the means in the interval and ratio scaled variables are analysed by the t-statistic. Equality of variances is tested by the Levene's test and factor analysis was applied to identify any hidden (latent) dimensions in the objects for performance measurement based on the orthogonal Varimax rotation. This rotation leads to linearly independent factors, which is useful when interpreting the results. Factor analysis is a useful statistical tool for reducing a large set of correlated variables to a small number of unrelated dimensions, in searching for a typology. The factors scores are applied in the regression analysis to explain the performance of the company. The significance of the regression is tested by the F-statistic while the significance of the regression coefficients is evaluated by the t-statistics.

4. Empirical Results

4.1. Background of the respondents

Table 1 shows descriptive statistics of the companies for both the Finnish and UK companies. The average number of full-time is a little larger in Finnish companies than in the UK companies due to high concentration in the UK sample (there are a couple of companies with about 20 employees whereas the rest of companies only have less than 10 employees). The performance measured by the five-year average growth in turnover is about the same in the both countries, close to 23-25% annually. However, it seems that Finnish companies show better average five-year period return on investment although the difference is not statistically significant³. Finnish companies tend to ex-

¹ To avoid confusions and to enhance comparability of results, the original version of the questionnaire was translated into English by one of the authors and checked by an individual fluent in both Finnish and English and accounting jargons.

² See Langfield-Smith (1997).

³ Due to the small number of observations, the differences should be very notable to give a statistically significant result.

port their finished output more than the UK counterparts. For the level of investments on R&D, there are no statistically significant differences between the companies in both countries.

Table 1

Descriptive statistics of the sample companies (n: Finland = 27, UK = 10)

| Variable | Country | N | Mean | Std | Levene's test Equality of variances | | t-test Equality of means | |
|--|---------|----|--------|--------|--|-----------------------------|-----------------------------|---------------|
| | | | | | Significance | Variances assumed | t-statistic | Signific. |
| Number of full-time employees | Finland | 27 | 16.537 | 2.859 | 0.0332 | Equal variances assumed | 2.9620 | 0.0055 |
| | UK | 9 | 12.000 | 6.384 | | Equal variances not assumed | 2.0643 | 0.0687 |
| Annual growth rate of turnover over the last five years | Finland | 26 | 25.358 | 39.610 | 0.7259 | Equal variances assumed | 0.1078 | 0.9148 |
| | UK | 9 | 23.667 | 43.327 | | Equal variances not assumed | 0.1031 | 0.9194 |
| Average annual return on investment (ROI) over the last five years | Finland | 23 | 17.632 | 18.561 | 0.1970 | Equal variances assumed | 1.2365 | 0.2262 |
| | UK | 8 | 8.375 | 17.188 | | Equal variances not assumed | 1.2849 | 0.2210 |
| Proportion of turnover from export | Finland | 26 | 13.446 | 21.619 | 0.0403 | Equal variances assumed | 1.3308 | 0.1936 |
| | UK | 5 | 0.400 | 0.894 | | Equal variances not assumed | 3.0634 | 0.0051 |
| Percentage of turnover invested in R&D | Finland | 24 | 4.917 | 11.423 | 0.5379 | Equal variances assumed | -0.5199 | 0.6071 |
| | UK | 7 | 7.429 | 10.549 | | Equal variances not assumed | -0.5438 | 0.5979 |

Legend: 1) Shadowed area in variances adopted = adopted in the test;
2) Bolded text = statistically significant at the risk level of 10%.

Table 2 presents the background (contingency) variables for the both samples. There are no statistically significant differences in the number or percentage of people working on finance and administrative tasks between the countries. In both samples, the percentage of such people is about 13%. The level of competition both in Finland and in the UK is quite high (between moderate and high competition) and there are no statistically significant differences. Of the success factors, small companies in both countries focus much on the importance of high quality of products and services, and on time delivery. The only significant difference is the level of elasticity which means that UK companies tend to emphasize more than those Finnish companies. For the UK companies, the level of elasticity of products to the needs of customers seems to be the most important critical success factor.

Table 2

Background factors of the sample companies (n: Finland = 27, UK = 10)

| Variable | Country | N | Mean | Std | Levene's test | | t-test | |
|---|---------|----|--------|--------|---------------|-----------------------------|-----------------|-----------|
| | | | | | Signific. | Variances as- sumed | t- statistic | Signific. |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Employees working on finance & administrative (F&A) tasks | Finland | 27 | 2.093 | 2.935 | 0.3070 | Equal variances assumed | 0.6471 | 0.5219 |
| | UK | 9 | 1.444 | 0.882 | | Equal variances not assumed | 1.0178 | 0.3160 |
| Percentage of F&A people of all employees | Finland | 27 | 13.112 | 19.025 | 0.4396 | Equal variances assumed | -0.0282 | 0.9777 |
| | UK | 9 | 13.296 | 6.420 | | Equal variances not assumed | -0.0433 | 0.9658 |
| Competition \$ | Finland | 27 | 3.593 | 0.931 | 0.9673 | Equal variances assumed | 0.2657 | 0.7920 |
| | UK | 10 | 3.500 | 0.972 | | Equal variances not assumed | 0.2603 | 0.7980 |

Importance of success factor: £

| | | | | | | | | |
|---------------------|---------|----|-------|-------|---------------|-----------------------------|----------------|---------------|
| High quality | Finland | 27 | 4.370 | 1.006 | 0.8463 | Equal variances assumed | -0.3243 | 0.7476 |
| | UK | 10 | 4.500 | 1.269 | | Equal variances not assumed | -0.2909 | 0.7756 |
| Low price | Finland | 27 | 3.481 | 0.975 | 0.2881 | Equal variances assumed | 0.2334 | 0.8168 |
| | UK | 10 | 3.400 | 0.843 | | Equal variances not assumed | 0.2499 | 0.8054 |
| Short delivery time | Finland | 27 | 3.333 | 1.109 | 0.0807 | Equal variances assumed | -0.7064 | 0.4846 |
| | UK | 10 | 3.600 | 0.699 | | Equal variances not assumed | -0.8676 | 0.3936 |
| On time delivery | Finland | 27 | 4.407 | 0.888 | 0.8381 | Equal variances assumed | -0.2847 | 0.7776 |
| | UK | 10 | 4.500 | 0.850 | | Equal variances not assumed | -0.2907 | 0.7748 |
| Elasticity | Finland | 27 | 4.148 | 0.989 | 0.1059 | Equal variances assumed | -2.0046 | 0.0528 |
| | UK | 10 | 4.800 | 0.422 | | Equal variances not assumed | -2.8059 | 0.0082 |

Certainty in predicting: &

| | | | | | | | | |
|---------------------------------|---------|----|-------|-------|---------------|-----------------------------|----------------|---------------|
| Development of own company | Finland | 27 | 3.148 | 0.602 | 0.0746 | Equal variances assumed | -2.9755 | 0.0053 |
| | UK | 10 | 3.900 | 0.876 | | Equal variances not assumed | -2.5052 | 0.0272 |
| Success of alternative products | Finland | 27 | 3.148 | 0.662 | 0.0005 | Equal variances assumed | 1.2759 | 0.2104 |
| | UK | 10 | 2.700 | 1.494 | | Equal variances not assumed | 0.9156 | 0.3808 |
| Behaviour of competitors | Finland | 27 | 2.593 | 0.747 | 0.4910 | Equal variances assumed | -2.6953 | 0.0107 |
| | UK | 10 | 3.400 | 0.966 | | Equal variances not assumed | -2.3912 | 0.0324 |

Table 2 (continuous)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|-------------------------------------|---------|----|-------|-------|--------|-----------------------------|----------------|---------------|
| Taste and behaviour of customers | Finland | 27 | 3.222 | 0.751 | 0.1432 | Equal variances assumed | -2.8770 | 0.0068 |
| | UK | 10 | 4.000 | 0.667 | | Equal variances not assumed | -3.0428 | 0.0070 |
| Development of technology | Finland | 27 | 3.556 | 0.641 | 0.1469 | Equal variances assumed | -0.5329 | 0.5975 |
| | UK | 10 | 3.700 | 0.949 | | Equal variances not assumed | -0.4454 | 0.6639 |
| Availability of competent employees | Finland | 27 | 3.370 | 0.742 | 0.2253 | Equal variances assumed | 0.5155 | 0.6094 |
| | UK | 10 | 3.200 | 1.229 | | Equal variances not assumed | 0.4114 | 0.6883 |
| Price level of products | Finland | 17 | 3.176 | 0.728 | 0.9016 | Equal variances assumed | -1.4811 | 0.1511 |
| | UK | 10 | 3.600 | 0.699 | | Equal variances not assumed | -1.4971 | 0.1503 |

- Legend:
- 1) Shaded area in variances adopted = adopted in the test;
 - 2) Bolded text = statistically significant at the risk level of 10%;
 - 3) \$ = scale: 1 = no, 2 = minor, 3 = moderate, 4 = high, 5 = extremely high competition;
 - 4) £ = scale: 1 = no, 2 = little, 3 = average, 4 = high, 5 = very high significance;
 - 5) & = scale: 1 = no, 2 = weakly, 3 = moderately, 4 = accurately, 5 = perfectly predictable.

If we consider the perceived strategic types identified by the companies, there are no statistically significant differences between the two countries. However, it is notable that none of the UK companies has classified itself as a prospector that invests heavily in new products and markets, in comparison to 16% of the responded Finnish companies indicated that they are in the position as a prospector. Out of the total responded, 50% of the UK companies belong to the defenders group (which invest heavily to improve efficiency in old products and markets) and the remaining 50% to analysers (which include the characteristics of both prospectors and defenders). For the Finnish companies, these proportions are 25% and 60% respectively.

Table 2 shows how the companies have perceived uncertainty when predicting the development on several areas of their businesses. There are statistically significant differences in only two of the listed seven areas. Finnish companies report a perceived higher uncertainty when predicting the behaviour of competitors as well as the taste and behaviour of customers. In all, the analysis of the contingency variables shows that Finnish and UK companies may operate in a similar environment with a few exceptions. First, Finnish companies define themselves more often as a prospector while the UK companies give more weight to elasticity in their products. Moreover, the perceived uncertainty on some areas is higher for Finnish companies, this implies that differences in changes in measuring performance may exist in both countries but it is relatively significant in Finland.

3.2. Change in performance measurement systems

Table 3 shows the changes in the performance measurement systems in Finnish and UK companies. The number of respondents is relatively smaller than the total number of samples because some respondents choose not to respond to this question. For the UK companies, the proportion of the users is notably larger than for the Finnish companies, and varies between 60-80%. For Finnish companies, the proportion of users is the largest in the systems at the company's level (74%) and the lowest in the performance measurement systems for teams or production cells (30%). This is largely due to small number of users despite there are no statistical significant differences in the change of performance measurement systems between the two countries. However, these changes seem to be at a larger

level in Finnish companies. The largest changes in Finnish companies have been experienced in systems that measure performance of activities and processes. This may be caused by the diffusion of the activity-based costing in Finnish small companies during the last years (see Laitinen, 2001). In the UK, the largest changes have been made in systems measuring performance of profit or cost centres. In summary, the results support the notion of both Finnish and UK companies rely on employees, production lines and activities to formulate their performance measurement system.

Table 3

Change in performance measurement systems for the users of systems

| Variable | Country | N | Mean | Std | Levene's test | | t-test | |
|--|---------|----|-------|-------|---------------|-----------------------------|-------------|-----------|
| | | | | | Signifig. | Variations as- sumed | t-statistic | Signifig. |
| Performance measurement of individual employees | Finland | 14 | 3.286 | 1.637 | 0.2864 | Equal variances assumed | 0.6738 | 0.5081 |
| | UK | 8 | 2.750 | 2.053 | | Equal variances not assumed | 0.6321 | 0.5390 |
| Performance measurement of teams or production cells | Finland | 8 | 3.875 | 1.553 | 0.7820 | Equal variances assumed | 0.9789 | 0.3470 |
| | UK | 6 | 3.000 | 1.789 | | Equal variances not assumed | 0.9577 | 0.3608 |
| Performance measurement of activities and processes | Finland | 10 | 4.000 | 1.563 | 0.1446 | Equal variances assumed | 1.4688 | 0.1613 |
| | UK | 8 | 2.750 | 2.053 | | Equal variances not assumed | 1.4234 | 0.1785 |
| Performance measurement of profit and cost centers | Finland | 12 | 3.833 | 1.749 | 0.9111 | Equal variances assumed | 0.3803 | 0.7087 |
| | UK | 6 | 3.500 | 1.761 | | Equal variances not assumed | 0.3794 | 0.7123 |
| Performance measurement at the level of the firm | Finland | 20 | 3.700 | 1.625 | 0.3861 | Equal variances assumed | 1.0649 | 0.2967 |
| | UK | 8 | 3.000 | 1.414 | | Equal variances not assumed | 1.1324 | 0.2754 |

Legend: 1) Shaded area in variances adopted = adopted in the test;
 2) Bolded text = statistically significant at the risk level of 10%;
 3) \$ = scale for the change: 1 = no, 2 = minor, 3 = considerable, 4 = large change, 5 = entirely new system.

4.3. Variables of measuring performance

Table 4 shows the importance of alternative objects for performance measurement in the samples. The managers were asked how important they consider a set of performance measures organized according to the performance measurement system presented by Laitinen (2002). There are several statistically significant differences in the importance between Finnish and UK companies. In general, Finnish companies give higher weights to the objects than the UK companies do. When measured by the t-statistic, the largest difference is in resources spent on employment development that is very important to Finnish companies but shows only minor importance to their UK counterparts. There are important differences also in capacity utilization of employees and motivation of employees. These results show that Finnish companies emphasize more the performance of employees from alternative perspectives.

However, the second largest difference is observed in the resources spent on new product development. The results show that there are statistical significant differences in the importance of all

the measurement objects in the categories of efficiency of activities, properties of products, and product and customer profitability. Among all these measures, Finnish companies regard them as more important than the UK companies do. These results may be caused by the popularity of activity-based costing in Finland, which is also associated with the changes in performance measurement systems for activities and processes, observed above.

Table 4

Perceived importance of alternative measurement objects in performance measurement at the present

| Variable | Country | N | Mean | Std | Levene's test | | t-test | |
|---|---------|----|-------|-------|---------------|-----------------------------|-------------|-----------|
| | | | | | Signific. | Variances assumed | t-statistic | Signific. |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 1. Cost structure | | | | | | | | |
| Cost structure by production factors | Finland | 18 | 3.611 | 1.243 | 0.5475 | Equal variances assumed | 2.5445 | 0.0172 |
| | UK | 10 | 2.300 | 1.418 | | Equal variances not assumed | 2.4474 | 0.0258 |
| 2. Production factors | | | | | | | | |
| Capacity utilization of space | Finland | 25 | 2.880 | 1.201 | 0.1206 | Equal variances assumed | 0.6880 | 0.4963 |
| | UK | 10 | 2.600 | 0.699 | | Equal variances not assumed | 0.8575 | 0.3984 |
| Capacity utilization of machinery | Finland | 25 | 3.120 | 1.424 | 0.3483 | Equal variances assumed | 1.4701 | 0.1513 |
| | UK | 9 | 2.333 | 1.225 | | Equal variances not assumed | 1.5805 | 0.1331 |
| Capacity utilization of employees | Finland | 25 | 3.960 | 0.978 | 0.5195 | Equal variances assumed | 3.6151 | 0.0010 |
| | UK | 10 | 2.600 | 1.075 | | Equal variances not assumed | 3.4676 | 0.0034 |
| Condition of space (age, performance) | Finland | 25 | 2.920 | 1.038 | 0.5307 | Equal variances assumed | 0.3186 | 0.7520 |
| | UK | 10 | 2.800 | 0.919 | | Equal variances not assumed | 0.3361 | 0.7406 |
| Condition of machinery (age, performance) | Finland | 25 | 3.400 | 1.190 | 0.9107 | Equal variances assumed | 1.6183 | 0.1151 |
| | UK | 10 | 2.700 | 1.059 | | Equal variances not assumed | 1.7033 | 0.1052 |
| Motivation of employees | Finland | 25 | 4.200 | 1.000 | 0.5994 | Equal variances assumed | 3.4797 | 0.0014 |
| | UK | 10 | 2.900 | 0.994 | | Equal variances not assumed | 3.4883 | 0.0029 |
| Resources spent on employment development | Finland | 24 | 3.625 | 0.924 | 0.2508 | Equal variances assumed | 4.9085 | 0.0000 |
| | UK | 10 | 1.800 | 1.135 | | Equal variances not assumed | 4.5005 | 0.0005 |
| 3. Efficiency of activities | | | | | | | | |
| Time taken by activities | Finland | 25 | 4.080 | 0.997 | 0.0274 | Equal variances assumed | 3.8779 | 0.0005 |
| | UK | 10 | 2.400 | 1.506 | | Equal variances not assumed | 3.2549 | 0.0067 |

Table 4 (continuous)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|--|---------|----|-------|-------|--------|-----------------------------|--------|--------|
| Cost of activities | Finland | 25 | 4.080 | 0.954 | 0.0105 | Equal variances assumed | 3.4962 | 0.0014 |
| | UK | 10 | 2.600 | 1.506 | | Equal variances not assumed | 2.8856 | 0.0137 |
| Quality of activities | Finland | 25 | 4.120 | 0.927 | 0.1212 | Equal variances assumed | 3.3665 | 0.0019 |
| | UK | 10 | 2.800 | 1.317 | | Equal variances not assumed | 2.8961 | 0.0127 |
| 4. Properties of products | | | | | | | | |
| Customer satisfaction with normal products | Finland | 24 | 4.333 | 0.868 | 0.0084 | Equal variances assumed | 2.4731 | 0.0189 |
| | UK | 10 | 3.300 | 1.567 | | Equal variances not assumed | 1.9635 | 0.0745 |
| Customer satisfaction with special products | Finland | 25 | 4.440 | 1.003 | 0.4463 | Equal variances assumed | 1.9410 | 0.0608 |
| | UK | 10 | 3.700 | 1.059 | | Equal variances not assumed | 1.8950 | 0.0765 |
| Resources spent on new product development | Finland | 25 | 3.640 | 1.075 | 0.3922 | Equal variances assumed | 4.3335 | 0.0001 |
| | UK | 10 | 2.000 | 0.816 | | Equal variances not assumed | 4.8801 | 0.0001 |
| Number of new products or variations | Finland | 25 | 3.400 | 1.000 | 0.2373 | Equal variances assumed | 3.0046 | 0.0050 |
| | UK | 10 | 2.200 | 1.229 | | Equal variances not assumed | 2.7450 | 0.0158 |
| 5. Product and customer profitability | | | | | | | | |
| Product profitability | Finland | 26 | 4.269 | 0.962 | 0.2245 | Equal variances assumed | 2.2856 | 0.0286 |
| | UK | 10 | 3.400 | 1.174 | | Equal variances not assumed | 2.0878 | 0.0557 |
| Customer profitability | Finland | 25 | 3.920 | 0.954 | 0.0512 | Equal variances assumed | 3.6788 | 0.0008 |
| | UK | 10 | 2.400 | 1.430 | | Equal variances not assumed | 3.0972 | 0.0090 |
| 6. Competitiveness | | | | | | | | |
| Growth of revenues | Finland | 25 | 3.720 | 0.980 | 0.0103 | Equal variances assumed | 1.6117 | 0.1165 |
| | UK | 10 | 3.000 | 1.633 | | Equal variances not assumed | 1.3036 | 0.2175 |
| Change in market share | Finland | 26 | 3.500 | 1.030 | 0.6513 | Equal variances assumed | 1.0249 | 0.3126 |
| 7. Financial performance | | | | | | | | |
| Company profitability | Finland | 26 | 4.462 | 0.905 | 0.0004 | Equal variances assumed | 2.2471 | 0.0312 |
| | UK | 10 | 3.500 | 1.650 | | Equal variances not assumed | 1.7448 | 0.1085 |
| Liquidity | Finland | 26 | 4.346 | 0.936 | 0.0227 | Equal variances assumed | 0.8813 | 0.3844 |
| | UK | 10 | 4.000 | 1.333 | | Equal variances not assumed | 0.7528 | 0.4654 |

Table 4 (continuous)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---------|----|-------|-------|--------|-----------------------------|---------|--------|
| Capital structure (indebtedness) | Finland | 26 | 3.885 | 0.909 | 0.0074 | Equal variances assumed | -0.0365 | 0.9711 |
| | UK | 10 | 3.900 | 1.595 | | Equal variances not assumed | -0.0288 | 0.9776 |
| 8. Environmental effects | | | | | | | | |
| Environmental effect of production | Finland | 25 | 2.760 | 1.268 | 0.2775 | Equal variances assumed | 0.9068 | 0.3711 |
| | UK | 10 | 2.300 | 1.567 | | Equal variances not assumed | 0.8264 | 0.4225 |
| Environmental effect of use of products | Finland | 25 | 2.840 | 1.281 | 0.0743 | Equal variances assumed | 0.4544 | 0.6525 |
| | UK | 10 | 2.600 | 1.713 | | Equal variances not assumed | 0.4006 | 0.6951 |

Legend: 1) Shaded area in variances adopted = adopted in the test;
 2) Bolded text = statistically significant at the risk level of 10%;
 3) \$ = scale: 1 = no, 2 = minor, 3 = moderate, 4 = high, 5 = extremely high importance in measurement.

When the most important objects of measurement are ranked, the Finnish companies give the highest weights to company profitability, customer satisfaction with special products (elasticity) and normal products, liquidity and product profitability. The UK companies regard liquidity, capital structure, customer satisfaction with special products, and product profitability as most important objects. Thus, the sample companies irrespective of the home country pay a lot of attention to financial performance measures and, in addition, to customer satisfaction as a non-financial measure. This result shows that while the non-financial measures show some importance, the performance measurement may still be dominated by financial measures. The high importance of customer satisfaction with special products is consistent with the high weight given to elasticity of products to customer needs as a critical success factor. Furthermore, the UK companies do not give to company profitability as much attention as their Finnish counterparts do, which may partly explain the observed differences in profitability.

Table 5

Predicted importance of alternative measurement objects in performance measurement after five years

| Variable | Country | N | Mean | Std | Levene's test Equality of variances | | t-test Equality of means | |
|--------------------------------------|---------|----|-------|-------|--|-----------------------------|-----------------------------|-----------|
| | | | | | Signific. | Variances assumed | t-statistic | Signific. |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 1. Cost structure | | | | | | | | |
| Cost structure by production factors | Finland | 21 | 3.905 | 0.995 | 0.0281 | Equal variances assumed | 3.1012 | 0.0043 |
| | UK | 10 | 2.500 | 1.509 | | Equal variances not assumed | 2.6791 | 0.0191 |
| 2. Production factors | | | | | | | | |
| Capacity utilization of space | Finland | 26 | 3.231 | 1.275 | 0.0768 | Equal variances assumed | 0.0709 | 0.9439 |
| | UK | 10 | 3.200 | 0.789 | | Equal variances not assumed | 0.0871 | 0.9312 |
| Capacity utilization of machinery | Finland | 25 | 3.080 | 1.441 | 0.5535 | Equal variances assumed | 0.7528 | 0.4571 |
| | UK | 9 | 2.667 | 1.323 | | Equal variances not assumed | 0.7846 | 0.4446 |

Table 5 (continuous)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|--|---------|----|-------|-------|--------|-----------------------------|--------|--------|
| Capacity utilization of employees | Finland | 25 | 4.240 | 0.970 | 0.2623 | Equal variances assumed | 3.1486 | 0.0035 |
| | UK | 10 | 3.000 | 1.247 | | Equal variances not assumed | 2.8214 | 0.0139 |
| Condition of space (age, performance) | Finland | 25 | 3.200 | 1.118 | 0.1513 | Equal variances assumed | 0.2599 | 0.7966 |
| | UK | 10 | 3.100 | 0.738 | | Equal variances not assumed | 0.3094 | 0.7595 |
| Condition of machinery (age, performance) | Finland | 25 | 3.640 | 1.350 | 0.4628 | Equal variances assumed | 0.9248 | 0.3618 |
| | UK | 10 | 3.200 | 1.033 | | Equal variances not assumed | 1.0382 | 0.3106 |
| Motivation of employees | Finland | 25 | 4.440 | 1.003 | 0.3603 | Equal variances assumed | 2.8296 | 0.0079 |
| | UK | 10 | 3.300 | 1.252 | | Equal variances not assumed | 2.5689 | 0.0224 |
| Resources spent on employment development | Finland | 24 | 3.750 | 0.944 | 0.0194 | Equal variances assumed | 3.7741 | 0.0007 |
| | UK | 10 | 2.200 | 1.398 | | Equal variances not assumed | 3.2132 | 0.0071 |
| 3. Efficiency of activities | | | | | | | | |
| Time taken by activities | Finland | 25 | 4.120 | 1.013 | 0.0210 | Equal variances assumed | 3.4773 | 0.0014 |
| | UK | 10 | 2.600 | 1.506 | | Equal variances not assumed | 2.9376 | 0.0120 |
| Cost of activities | Finland | 25 | 4.120 | 1.013 | 0.0774 | Equal variances assumed | 3.1182 | 0.0038 |
| | UK | 10 | 2.800 | 1.398 | | Equal variances not assumed | 2.7136 | 0.0178 |
| Quality of activities | Finland | 25 | 4.280 | 0.936 | 0.1600 | Equal variances assumed | 3.7539 | 0.0007 |
| | UK | 10 | 2.800 | 1.317 | | Equal variances not assumed | 3.2420 | 0.0065 |
| 4. Properties of products | | | | | | | | |
| Customer satisfaction with normal products | Finland | 24 | 4.500 | 0.885 | 0.0208 | Equal variances assumed | 2.7402 | 0.0100 |
| | UK | 10 | 3.400 | 1.430 | | Equal variances not assumed | 2.2593 | 0.0433 |
| Customer satisfaction with special products | Finland | 25 | 4.520 | 1.005 | 0.0922 | Equal variances assumed | 1.5619 | 0.1278 |
| | UK | 10 | 3.900 | 1.197 | | Equal variances not assumed | 1.4464 | 0.1695 |
| Resources spent on new product development | Finland | 25 | 3.880 | 1.130 | 0.2509 | Equal variances assumed | 3.0859 | 0.0041 |
| | UK | 10 | 2.500 | 1.354 | | Equal variances not assumed | 2.8504 | 0.0126 |
| Number of new products or variations | Finland | 25 | 3.560 | 1.121 | 0.3056 | Equal variances assumed | 1.9006 | 0.0661 |
| | UK | 10 | 2.700 | 1.418 | | Equal variances not assumed | 1.7153 | 0.1087 |
| 5. Product and customer profitability | | | | | | | | |
| Product profitability | Finland | 26 | 4.423 | 0.902 | 0.6437 | Equal variances assumed | 1.5703 | 0.1256 |
| | UK | 10 | 3.900 | 0.876 | | Equal variances not assumed | 1.5919 | 0.1300 |

Table 5 (continuous)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---------|----|-------|-------|--------|-----------------------------|---------|--------|
| Customer profitability | Finland | 25 | 4.280 | 0.980 | 0.0101 | Equal variances assumed | 2.8653 | 0.0072 |
| | UK | 10 | 3.000 | 1.633 | | Equal variances not assumed | 2.3175 | 0.0395 |
| 6. Competitiveness | | | | | | | | |
| Growth of revenues | Finland | 26 | 3.923 | 1.017 | 0.0370 | Equal variances assumed | 1.1801 | 0.2462 |
| | UK | 10 | 3.400 | 1.578 | | Equal variances not assumed | 0.9736 | 0.3495 |
| Change in market share | Finland | 26 | 3.615 | 1.098 | 0.9816 | Equal variances assumed | 0.7603 | 0.4523 |
| | UK | 10 | 3.300 | 1.160 | | Equal variances not assumed | 0.7417 | 0.4693 |
| 7. Financial performance | | | | | | | | |
| Company profitability | Finland | 26 | 4.654 | 0.846 | 0.0011 | Equal variances assumed | 1.9477 | 0.0597 |
| | UK | 10 | 3.900 | 1.449 | | Equal variances not assumed | 1.5468 | 0.1491 |
| Liquidity | Finland | 26 | 4.308 | 0.970 | 0.3281 | Equal variances assumed | 0.2847 | 0.7776 |
| | UK | 10 | 4.200 | 1.135 | | Equal variances not assumed | 0.2650 | 0.7947 |
| Capital structure (indebtedness) | Finland | 26 | 3.923 | 0.977 | 0.0079 | Equal variances assumed | -0.1743 | 0.8627 |
| | UK | 10 | 4.000 | 1.633 | | Equal variances not assumed | -0.1397 | 0.8913 |
| 8. Environmental effects | | | | | | | | |
| Environmental effect of production | Finland | 25 | 3.120 | 1.364 | 0.1628 | Equal variances assumed | 1.3304 | 0.1925 |
| | UK | 10 | 2.400 | 1.647 | | Equal variances not assumed | 1.2249 | 0.2405 |
| Environmental effect of use of products | Finland | 25 | 3.080 | 1.352 | 0.0789 | Equal variances assumed | 0.5016 | 0.6193 |
| | UK | 10 | 2.800 | 1.814 | | Equal variances not assumed | 0.4416 | 0.6659 |

Legend: 1) Shadowed area in variances adopted = adopted in the test;
2) Bolded text = statistically significant at the risk level of 10%;
3) \$ = scale: 1 = no, 2 = minor, 3 = moderate, 4 = high, 5 = extremely high importance in measurement.

What is important is to notice that the weightings of the financial and non-financial objects in performance measurement may be valid also in the near future. Table 5 shows that for Finnish companies the predicted order of importance in measurement objects will be stay unchanged for the next five year period. Company profitability followed by customer satisfaction will be the most important object. However, also employee motivation will rise into the top of ranking. In the UK companies, the future objects also seem to be the same that is, liquidity, capital structure, and customer satisfaction with special products. However, company profitability will raise its importance, which may be due to the low figures of profitability observed for them.

4.4. Main performance dimensions

Because of the variety of objects for performance measurement in the previous tables, it is difficult to identify the main dimensions emphasized by the companies. Therefore, a factor analysis with a Varimax rotation was performed to identify the hidden dimensions. Table 6 presents the factor load-

ings for the three-factor solution. The solution accounted for 67.2% of the total variation of the weightings given by the Finnish and UK companies. Although there were several factors with a given value over unity, a three-factor solution was chosen to ease interpretations. The first factor itself accounts for 29% of the total variation. The highest loadings of this factor include efficiency of activities, properties of product, customer profitability, resources spent on employment development, and motivation of employees. Laitinen (2002) classifies these as internal performance within the IPMS and characterized by both financial and non-financial performance measurements.

Table 6

Varimax-rotated factor solution for all the companies (N = 37)

| Variable | Factor loadings: | | |
|--|------------------|---------------|---------------|
| | Factor 1 | Factor 2 | Factor 3 |
| 1. Cost structure | | | |
| Cost structure by production factors | 0.5674 | 0.0900 | 0.4058 |
| 2. Production factors | | | |
| Capacity utilization of space | 0.1999 | -0.0394 | 0.6945 |
| Capacity utilization of machinery | 0.2860 | 0.2924 | 0.6264 |
| Capacity utilization of employees | 0.6760 | 0.3854 | 0.0918 |
| Condition of space (age, performance) | -0.0758 | 0.4163 | 0.5828 |
| Condition of machinery (age, performance) | 0.1762 | 0.3988 | 0.5593 |
| Motivation of employees | 0.7454 | 0.2609 | 0.2658 |
| Resources spent on employment development | 0.8592 | 0.1765 | 0.1924 |
| 3. Efficiency of activities | | | |
| Time taken by activities | 0.7632 | 0.3812 | 0.2457 |
| Cost of activities | 0.7320 | 0.3141 | 0.3304 |
| Quality of activities | 0.8864 | 0.1416 | 0.0598 |
| 4. Properties of products | | | |
| Customer satisfaction with normal products | 0.5720 | 0.5496 | -0.0001 |
| Customer satisfaction with special products | 0.6239 | 0.4522 | 0.2138 |
| Resources spent on new product development | 0.7271 | 0.1590 | 0.3109 |
| Number of new products or variations | 0.5982 | 0.1731 | 0.5505 |
| 5. Product and customer profitability | | | |
| Product profitability | 0.3362 | 0.7372 | 0.3409 |
| Customer profitability | 0.8151 | 0.2271 | 0.3222 |
| 6. Competitiveness | | | |
| Growth of revenues | 0.3735 | 0.7895 | -0.0010 |
| Change in market share | 0.2476 | 0.6614 | 0.1072 |
| 7. Financial performance | | | |
| Company profitability | 0.3166 | 0.8729 | 0.1118 |
| Liquidity | 0.2456 | 0.8051 | 0.1404 |
| Capital structure (indebtedness) | 0.0234 | 0.7581 | 0.3364 |
| 8. Environmental effects | | | |
| Environmental effect of production | 0.2923 | 0.1530 | 0.7367 |
| Environmental effect of use of products | 0.2738 | 0.0400 | 0.7576 |
| Eigenvalue | 7.0380 | 5.1667 | 3.9203 |
| Percent of variance explained | 29.3249 | 21.5281 | 16.3344 |

Legend: Bolded text = loading larger than 0.5.

The second factor accounts for 22% of the total variation in the variables. The highest loadings include competitiveness and financial performance. Laitinen (2002) treats these as external performance. Based on the Varimax test, these two factors are linearly independent of each other,

which means that the internal performance does not strongly depend on the external performance. The third factor accounts for 16% of the total variation. The highest loadings included those of the environmental effects and production factors other than the employees¹. These results imply that both Finnish and UK companies reckon that environmental and non-human production factors play a major part in performance of companies.

Table 7 presents statistics for the factor scores in the Finnish and UK companies. There are no statistically significant differences in the scores of the second and third factors between the countries. However, the average score of the first factor ("internal performance") is clearly higher for the Finnish companies than for their UK counterparts. This means that Finnish companies relying more on internal performance in comparison to their UK counterparts.

Table 7

Factor scores for Finnish and UK companies

| Variable | Country | N | Mean | Std | Levene's test | | t-test | |
|--|---------|----|--------|-------|-----------------------|-----------------------------|-------------------|---------------|
| | | | | | Equality of variances | | Equality of means | |
| | | | | | Signific. | Variances assumed | t-statistic | Signifig. |
| Factor 1 score: Internal performance | Finland | 27 | 0.395 | 0.629 | 0.0456 | Equal variances assumed | 5.1699 | 0.0000 |
| | UK | 10 | -1.067 | 1.061 | | Equal variances not assumed | 4.0989 | 0.0016 |
| Factor 2 score: External performance | Finland | 27 | 0.043 | 0.694 | 0.0000 | Equal variances assumed | 0.4213 | 0.6761 |
| | UK | 10 | -0.115 | 1.609 | | Equal variances not assumed | 0.2999 | 0.7702 |
| Factor 3 score: Environmental and nonhuman production factor performance | Finland | 27 | 0.012 | 1.093 | 0.4545 | Equal variances assumed | 0.1170 | 0.9075 |
| | UK | 10 | -0.032 | 0.739 | | Equal variances not assumed | 0.1397 | 0.8901 |

Legend: 1) Shaded area in variances adopted = adopted in the test;
 2) Bolded text = statistically significant at the risk level of 10%.

4.5. Explaining competitiveness

The importance that the management gives to alternative performance dimensions directs its attention in management decision making and control and may thus affect the performance of the firm. To evaluate the significance of the measurement focus on the performance, factor scores were used to explain the competitiveness of the firm in the regression analysis. Competitiveness was measured by five-year average annual growth rate and five-year average return on investment (see Table 1). Furthermore, the country effect was measured by a dummy variable (UK = 1). Table 8 presents the results for the regression analyses run for the sample companies.

Panel 1 of Table 8 shows the regression results for the five-year growth rate. Besides the constant, the only statistically significant parameter value is obtained for the third factor, that is, for "environmental and non-human production factor performance". The coefficient of this factor score is

¹ In fact, the class of environmental effects is not included in the original performance system (see Lahtinen, 2002).

negative. The three factor scores and the dummy variable together explain about 24% of the growth rate. *This result means that the more companies give weight to environmental and nonhuman production factor performance, the lower the growth tends to be.* These companies give a lot attention to the capacity constraints of space and machinery and to the environmental effects of both products and production. This may be a reason why they grow slowly.

Panel 2 of the same table shows the results for the average rate of return on investment. The model accounts for 25% of the average rate and the regression is statistically significant at the 10% level. This significance is lower than the regression on growth rate because of a number of missing observations. In this regression, the country dummy is statistically significant and has a negative sign. This is natural taking into account the differences in the profitability level between the countries (see Table 1). Furthermore, the factor scores for the factors 2 and 3 have statistically significant, negative signs. *This means that the more weight companies give to external performance dimension as well as to environmental and non-human production factor performance dimension, the lower the profitability is.*

Table 8

Regression analysis based on factor scores for all companies (N = 37)

PANEL 1. Five-year growth in net sales as the dependent variable

1. Model summary

| R | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
|--------|----------|-------------------|----------------------------|---------------|
| 0.4936 | 0.2437 | 0.1428 | 36.9855 | 2.5140 |

2. Anova

| | Sum of Squares | df | Mean Square | F | Signific. |
|------------|----------------|---------|-------------|--------|-----------|
| Regression | 13222.5133 | 4.0000 | 3305.6283 | 2.4165 | 0.0705 |
| Residual | 41037.7684 | 30.0000 | 1367.9256 | | |
| Total | 54260.2817 | 34.0000 | | | |

3. Coefficients

| | Unstandardized Coefficients | Std | Standardized Coefficients | t-statistic | Signific. | VIF |
|----------------|-----------------------------|---------|---------------------------|-------------|-----------|--------|
| (Constant) | 22.3405 | 8.0502 | | 2.7752 | 0.0094 | |
| Country dummy | 7.6146 | 19.1073 | 0.0845 | 0.3985 | 0.6931 | 1.7844 |
| Factor 1 score | 7.0847 | 8.3058 | 0.1808 | 0.8530 | 0.4004 | 1.7828 |
| Factor 2 score | -6.0908 | 6.3358 | -0.1527 | -0.9613 | 0.3441 | 1.0010 |
| Factor 3 score | -17.4275 | 6.2006 | -0.4465 | -2.8106 | 0.0086 | 1.0012 |

PANEL 2. Five-year return on investment as the dependent variable

1. Model summary

| R | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
|--------|----------|-------------------|----------------------------|---------------|
| 0.4976 | 0.2476 | 0.1319 | 17.1429 | 1.6817 |

2. Anova

| | Sum of Squares | df | Mean Square | F | Signific. |
|------------|----------------|---------|-------------|--------|-----------|
| Regression | 2514.7771 | 4.0000 | 628.6943 | 2.1393 | 0.1044 |
| Residual | 7640.8686 | 26.0000 | 293.8796 | | |
| Total | 10155.6457 | 30.0000 | | | |

Table 8 (continuous)

3. Coefficients

| | Unstandardized Coefficients | Std | Standardized Coefficients | t-statistic | Signific. | VIF |
|-----------------|-----------------------------|---------|---------------------------|-------------|-----------|--------|
| (Constant) | 21.9591 | 4.7849 | | 4.5892 | 0.0001 | |
| Country dummy\$ | -20.9883 | 12.1565 | -0.5074 | -1.7265 | 0.0961 | 2.9847 |
| Factor 1 score | -4.4493 | 5.1596 | -0.2526 | -0.8623 | 0.3964 | 2.9660 |
| Factor 2 score | -8.1650 | 3.8870 | -0.4083 | -2.1006 | 0.0455 | 1.3055 |
| Factor 3 score | -6.2071 | 3.1549 | -0.3514 | -1.9674 | 0.0599 | 1.1022 |

Legend: Bolded text = statistically significant at the risk level of 10%;

\$ = Finland = 0, UK = 1.

5. Summary and Way Forward

The purpose of this study was to present preliminary survey evidence on performance measurement practices in micro companies from Finland the UK. These companies have less than 20 employees. The sample of the survey only included 27 Finnish and 10 UK companies. There is little evidence on the performance measurement systems in such small companies so that the results may give important implications in spite of the small sample size. The Finnish and UK companies did not differ in growth and R&D investments. However, *Finnish companies are more intensive in exporting their products and report higher profitability figures.*

The companies in both countries have a similar average proportion of finance and administrative people and a similar level of competition. They also emphasize in a similar way high quality and on time delivery as critical success factors. However, UK companies seem to give more attention to the elasticity of the products to the needs of their customers, than Finnish companies do. None of the UK companies did identify itself as a prospector while 16% of the Finnish companies reported to belong to this class of strategic type. Half of the UK companies are defenders while their proportion is only 25% for the Finnish companies.

Finnish companies report to perceive higher uncertainty when predicting the behaviour of competitors as well as the taste and behaviour of customers. The differences in adopted strategy and perceived uncertainty implied that there may be differences also in performance measurement systems between the Finnish and UK companies. *Finnish companies should have more management accounting changes to improve and maintain their systems.*

Due to small number of system adopters, there were no statistically significant differences in the change of performance measurement systems between the countries. Anyway, these changes seem to be at a larger level in Finnish companies. The largest changes in Finnish companies have been experienced in systems that measure performance of activities and processes, maybe due to popularity of ABC. *Hence, the results give weak support to the implications above although no statistically significant differences were found.* More empirical evidence is needed to confirm this conclusion.

The popularity of ABC may have also caused differences in performance measurement objects. When comparing performance measurement objects between the countries, it showed that Finnish companies emphasize more the performance of employees from alternative perspectives. Moreover, there were statistically significant differences in the importance of all the measurement objects in the categories of efficiency of activities, properties of products, and product and customer profitability. In all these measures, Finnish companies regard them as more important than the UK companies do.

The sample companies irrespective of the home country give a lot of attention to financial performance measures and, in addition, to customer satisfaction as a non-financial measure. *This result shows that while the non-financial measures show some importance, the performance measurement may still be dominated by financial measures.* The UK companies gave a lot of impor-

tance to the special needs of customers, which is consistent with the high weight given to elasticity of products to customer needs as a critical success factor. In addition, the UK companies do not give to company profitability as much attention as their Finnish counterparts, which may partly explain the observed differences in profitability. The importance of the main measurement objects seem to be stable and may change only a little in the next five years.

Factor analysis showed that the objects could be classified into three main classes on empirical grounds. First, the dominant performance measurement dimension can be called as "*internal performance*". This dimension is characterized by both financial and non-financial performance measures. The second main dimension will be called as "*external performance*" and, finally, the third main dimension as "*environmental and nonhuman production factor performance*". There were no statistically significant differences in the scores of the second and third factors between the countries. However, the average score of the first factor was clearly higher for the Finnish companies than for their UK counterparts.

The regression analysis results showed that the more companies give weight to environmental and nonhuman production factor performance, the lower the rate of growth will be. These results also showed that the more weight companies give to external performance dimension as well as to environmental and nonhuman production factor performance dimension, the lower the profitability is. These results should be regarded as preliminary due to the small number of observations.

Future research should include the following: (1) attempt to increase the sample size to capture a better representative analysis in future, (2) the increased sample size should be analysed according to industries or sectors and whether there is any differences on the emphasis on how performance be measured between and within the industries, (3) case studies and interviews could be conducted to support or otherwise reject the above findings. Through various investigative approaches, one could learn more about how a particular company or industry reacts due to internal and external factors. All these would be useful to the business communities and managers in the decision making processes.

References

1. Adimando, C., Butler, R., Malley, S., Ravid, S.A., Shepro, R., Vernon, R.H., Willet, J., Zimmerman, J., 1994. Stern Stewart EVA Roundtable. *Journal of Applied Corporate Finance*. 7.2. 46-70.
2. Andersin, H., Karjalainen, J. and Laakso, T., 1994. Suoritusten mittaus ohjausvälineenä. Performance Measurement as a Steering Tool (in Finnish). Helsinki: Metalliteollisuuden Kustannus Oy.
3. Anderson, S.W. and Young, S.M., 1999. The impact of contextual and process factors on the evaluation of activity-based costing systems. *Accounting, Organizations and Society*. 24. 525-559.
4. Berry, M., 1998. Strategic Planning in Small High Tech Companies. *Long Range Planning*. 31. 3. 455-466.
5. Birch, C. 1998. Balanced Scorecard points to wins for small companies. *Australian CPA*. July. 68. 6. 43-45.
6. Bromwich, M., and Bhimani, A., 1989. Management accounting pathways to progress. CIMA, UK.
7. Chenhall, R.H., 2003. Management control systems design within its organisational context: findings from contingency-based research and directions for the future. *Accounting, Organizations and Society*. 28. 127-168.
8. Davig, W., Elbert, N., and Brown, S., 2004. Implementing a Strategic Planning Model for Small Manufacturing Companies: An Adaptation of the Balanced Scorecard. *S.A.M. Advanced Management Journal*. 69. 1. 18-25.
9. Drury, C. 1990. Cost control and performance measurement in an AMT environment. *Management Accounting*. November.
10. Drury, C. and Tayles, M., 1993. A survey of management accounting practices in the UK manufacturing companies. Paper presented to the 16th European Accounting Conference, Turku, Finland. April.
11. Frigo, M.L. and Krumwiede, K.R. 1999. Balanced scorecards: A rising trend in strategic performance measurement. *Journal of Strategic Performance Measurement*. February-March. 42-48.

12. Gates, S. (1999). Aligning Strategic performance measures and results. The conference Board. New York. NY.
13. Gosselin, M., 1997. The Effect of Strategy and Organizational Structure on the Adoption and Implementation of Activity-Based Costing. *Accounting, Organization and Society*. 22. 2. 105-122.
14. Hofstede, G., 1994. The Business of International Business is Culture. *International Business Review*. 3. 1. 1-14.
15. Horngren, C.T., 1995. Management Accounting: This Century and Beyond, *Management Accounting Research*. 6. 3. 281-286.
16. Ittner, C.D. and Larcker, D.F. 2001. Assessing empirical research in managerial accounting: a value-based management perspective. *Journal of Accounting and Economics*. 32. 349-410.
17. Kanji, G. and Moura e Sa, P., 2002. Kanji's business scorecard. *Total Quality Management*. 13.1. 13-27.
18. Kaplan, R.S. and Norton, D.O., 1992. The Balanced Scorecard – Measures that Drive Performance. *Harvard Business Review*. 70. 1. 71-79.
19. Kaplan, R.S. and Norton, D.O., 1996. The Balanced Scorecard – Translating Strategy into Action. Harvard Business School Press. Boston. MA.
20. Kaplan, R.S. and Norton, D.O., 2001. The Strategy Focused Organization: How Balanced Scorecard Companies Thrive in the New Business Environment. Harvard Business School Press. Boston. MA.
21. Khandwalla, P.N., 1972. The effect of different types of competition on the use of management controls. *Journal of Accounting Research*. 10.2. 275-285.
22. Langfield-Smith, K., 1997. Management Control Systems and Strategy: a Critical Review. *Accounting, Organizations and Society*. 22. 2. 207-232.
23. Laitinen, E.K., 2001. Management Accounting Change in Small Technology Companies: Towards a Mathematical Model of the Technology Firm. *Management Accounting Research*. 4. 507-541.
24. Laitinen, E.K., 2002. A Dynamic Performance Measurement System: Evidence from Small Finnish Technology Companies. *Scandinavian Journal of Management*. 18. 1. 65-99.
25. Libby, T. and Waterhouse, J.H., 1996. Predicting Change in Management Accounting Systems. *Journal of Management Accounting Research*. 8. 137-150.
26. Luft, J. and Shields, M., 2001. Why does fixation persists? Experimental evidence on the judgement performance effects of expressing intangibles. *Accounting Review*. 76. 4. 561-587.
27. Malina, M.A. and Selto, F.H., 2004. Choice and change of measures in performance measurement models. *Management Accounting Research*. 15.4. 441-469.
28. Maskell, B.H., 1989. Performance measurement for World Class Manufacturing 1-4, *Management Accounting*. 67. 5,6,7, 8.
29. Mia, L. and Clarke, B., 1999. Market Competition, Management Accounting Systems and Business Unit Performance. *Management Accounting Research*. 10. 137-158.
30. Mitchell, F. and Reid, G.C., 2000. Editorial. Problems, challenges and opportunities: the small business as a setting for management accounting research. *Management Accounting Research*. 11. 385-390.
31. Neely, A.D., 1999. The Performance Measurement Revolution: Why Now and What Next? *International Journal of Operations & Production Management*, 19. 2. 205-228.
32. Perren, L. and Grant, P., 2000. The evolution of management accounting in small businesses: a social construction perspective. *Management Accounting Research*. 2000. 11. 391-411.
33. Rappaport, A., 1999. New thinking on how to link executive pay to performance. *Harvard Business Review*. March-April, 91-101.
34. Smith, M., 1994. New Tools for Management Accounting. Putting Activity Based Costing and Non-Financial Indicators to Work. Pitman Publishing. London.
35. Statistics Finland. http://www.stat.fi/tup/maanum/maailmanumeroina_taulukot_en.html
36. Zimmerman, J., 1997. Accounting for decision-making and control. Irwin McGraw-Hill, Burr Ridge, IL.