Productivity management: the Japanese experience

Alan Stainer

Japan more than any other industrialized nation understands the link between productivity and quality

Japanese education and training

There has been a tendency among Western media and managers to caricature the Japanese workforce as unthinking servants of great corporations. This is just not true. One of the overriding impressions that is revealed on any visit to Japan is the emphasis on developing individuals to their full potential.

According to Glass[1], Japan has one of the most highly educated workforces in the world. Ninety-four per cent of its people are in full-time education up to the age of 18, compared with a mere 35 per cent in the United Kingdom. Even more revealing is the fact that the percentage of top managers with university degrees or equivalent in Japan is 85 per cent compared with 24 per cent in the United Kingdom. However, Sato and Sato[2] state that Japanese higher education does not have the same standard and breadth as that in the West. They also express the view that the Japanese have a lack of basic research and creativity.

Japanese employees, in addition to being better educated before their first day at work, tend to receive, as shown by Glass[1], significantly more on-the-job training than their Western counterparts. It is estimated that Japanese companies spend around 1.5 per cent of their turnover on training, which is ten times greater than in the United Kingdom. One of the primary corporate aims is to keep and develop skilled workers. This is because corporations realize that, having invested in new facilities and technology, they require skilled and qualified people to operate them effectively.

The vocational emphasis is also different in Japan. For instance, there are only 6,000 qualified accountants, which is one-twentieth of the number in the United Kingdom. Japanese universities have a far greater thrust in engineering than in business-oriented studies. There is a decided absence of MBA programmes and, according to Lorrman and Kenjo[3, p. 5], there are 70,000 MBA graduates in the USA per annum compared with just 100 in Japan. Indeed, it is clear that postgraduate management education is shunned by the Japanese, who prefer to train their staff into their own corporate cultures.

Japanese universities have an outward-looking approach. They are extremely keen on international collaboration and research as well as having a very good understanding of both US and European industries. Examples of such collaboration are the reports by Miller et al.[4], entitled Factories of the Future, comparing the USA, Japan and Europe in operational strategic attitudes. There is a considerable momentum in the industrial engineering area, embracing productivity and quality. The University of the Air, Japan's equivalent to the Open University in the United Kingdom, has programmes on both productivity and quality management, founded by Professor Kazukiyo Kurosawa.

Since 1945, the Japanese have bred a more equal industrial society. This is exemplified by the fact that a manufacturing employee in Japan earns 11.4 times less than a chief executive officer, compared to 16.8 in the United Kingdom and a massive 26.0 in the USA, as reported by Bennett[5]. This is partly due to culture and partly due to the fact that they have had the opportunity to start afresh.

Japanese attitudes to productivity

Productivity management has, in the past, mainly been practised in an informal manner, yet, like any other decision-making procedure, there is the need for it to be formalized. Sumant[6] puts forward four phases of productivity management in a productivity cycle (Figure 1), seen as a continuing process.

The author was awarded the R.M. Currie Travelling Fellowship by the Institute of Management Services to examine productivity management in Japan. This article is based on the Report to the Trustees, with their permission.
The Japanese place a greater emphasis on productivity improvement. Unlike the Europeans and the Americans, they are not great productivity measurers. Stainer[7] states that the Japan Management Association produced a study in 1985 which reported that while 79 per cent of European and US companies had adopted formal work measurement, the corresponding figure for Japanese industry was only 33 per cent; little has changed in recent years. One possible reason for this difference is that wage incentive systems, supported by work measurement, are far more common in the West than in Japan.

The Japan Productivity Center, the largest in the world of its kind, has three guiding principles, based on the conviction that productivity improvement could not be achieved without positive labour participation as well as sound and constructive labour management relations. These are:

1. **Increase of employment**: improvement in productivity will increase rather than reduce employment in the long run.

2. **Labour-management co-operation**: in order to increase productivity, labour and management must work together.

3. **Fair distribution of productivity gains**: the fruits of improved productivity should be distributed fairly among management, labour and consumers.

Within these guiding principles, there is no reference whatsoever made to rationalization or efficiency. The Japanese consider that productivity is not merely an output/input ratio but that it involves, in a substantial way, the human element. It is widely acknowledged that human resources are the sole natural wealth of Japan. The Japanese believe that productivity is not a conscious issue. In other words, it is part of the in-built corporate philosophy.

The philosophy of the integration of management, labour and customers is also featured in the Japanese thinking towards the relationship between productivity and quality. The Japanese were the first really to develop customer-driven quality and to understand the link between productivity and quality in the Deming chain reaction (Figure 2).

An international quality study, a joint project of Ernst & Young and the American Quality Foundation[8], found that the Japanese place more importance on incorporating customer research than their American counterparts. They also use technology twice as much in meeting customer expectations. As with productivity, they emphasize more strongly the process of improvement, simplification and cycle time reduction, with marked employee involvement.

It is obvious that the Japanese success in both productivity and quality management is by embodying these in all corporate thinking. They are very conscious of the fact that the rest of the world is copying their ideas, which they originally developed from the West. To improve performance further, they are looking at such scenarios as “holonic manufacturing” which allows much flexibility in an organic rather than mechanistic approach. In order to reduce lead time further, especially in the car industry, they are attempting to increase the “made-to-order” element.

The Japanese dynamics of productivity management, in a strategic sense, are perceived as an ongoing process. They seek incremental improvements (kaizen) for products and services in every aspect, from design and operations to sales and maintenance. They also aim to optimize life-cycle costs. In the automobile industry, Womack et al[9] describe lean production, where “lean” reflects the fact that it uses less of every resource, including time, compared to mass production. The focus is on the process of creating conditions in which all employees can contribute towards improvements. Productivity is seen as a way of life, where the employee becomes a “source” of improvement rather than a mere “resource”. Overall, organizational productivity is emphasized in long-term gains and synergy.

**Productivity within the Japanese economy**

It is a strange phenomenon that the Japanese are not vitally interested in productivity measurement at the corporate level, as are the Americans. This is witnessed by their different approaches to what each considers to be total productivity measurement/management.

To those outside Japan, total productivity measures represent output divided by all the inputs, including labour, materials, energy and capital. The Japanese
equivalent is based on the ideas of Professor Masao Akiba and developed by the Japan Management Association over the last ten years. When the Japanese talk about total productivity, they do not refer to a single measure which, in the West, is usually the inverse of unit cost. Their concept of total productivity, while recognizing that it is an output/input phenomenon, focuses on the elements within output and input, without consciously putting them together. For output, they embrace quality, quantity, delivery and price, and for input, manpower, facilities and materials. Rather than measure the output/input ratio, they concentrate on the indicators of the various elements.

The great strength of Japanese productivity management and thinking is probably its centralization for economic purposes, both at the macro and micro levels. For instance, the Japan Productivity Center has produced annually, for the last two decades, a widely-used Practical Handbook of Productivity and Labour Statistics. This publication, also in English, is an essential reference material for economists, academics and corporate executives who are interested in business performance. Trends and levels of labour productivity, wages, prices and other related data are given. Much of the handbook is devoted to international comparisons. Statistics are shown in a simplified and easy-to-understand format so that managers can readily see the meanings of figures and indices. It is also used as a basis for labour negotiations.

Japanese productivity information reflects the pride in their pre-eminence in manufacturing productivity, although they readily acknowledge their weakness and the challenge ahead in the service sector. Wessel[10] cites a survey by McKinsey Global Institute which concludes that the United States has a much higher level of service productivity than Japan. It also shows that, in most service industries, Japan is well behind Germany and France. Considerable effort is being made to analyse and improve productivity in the Japanese service industry. This is particularly important as 65 per cent of the economy is currently in that sector. Surprisingly for a country educating and training so many engineers, there is a growing tendency for the young and the bright to try and avoid working in manufacturing. This is because of what the Japanese call the three Ks, and the Koreans call the three Ds: Dirty, Difficult and Dangerous.

With regard to the service industries, the Japan Management Association concentrates on quality, cost and delivery, as a basis for improvement. They use the proxy measure approach (Figure 3).

Profitability via quality is proving extremely difficult in Japanese service industries. This is mainly due to the fact that, at present, the productivity philosophy is not as well developed as in the manufacturing sector.

![Figure 3. Service productivity proxy measure](image)

An area into which the Japanese are putting much effort is the improvement of their effectiveness and productivity in logistics. Logistics are considered to be the link between the processes of production/purchasing and marketing. They involve transportation, physical distribution and the movement of resources. Productivity again is looked at, rather than just a single measure, more as an analysis of factors of performance, which include:

- speed of operation;
- quality of operation;
- unit cost;
- flexibility from the supplier/customer viewpoints;
- the human element.

In such a densely populated and highly efficient environment as Japan, the controlling of logistics is a major concern for management. This is mainly due to the constantly changing environment and the unforeseen events which may affect forecast performance levels.

The small company in Japan

Especially in manufacturing, one of the successes of Japanese industry has been the small companies. Most of the large well-known corporations rely very heavily on the efficiency of their sub-contractors and the sub-subcontractors. For instance, Toyota sub-contract 90 per cent of their labour requirements. Small business executives complain that, while the large corporations boast of kanban and just-in-time (JIT), it is their sub-contractors that suffer by carrying the stock and being a buffer for lean times.

Many large manufacturers in Japan have formed keiretsu, or company coalitions, by grouping the sub-contractors who supply parts. The result is a production system, distributed among many firms, that has helped Japanese manufacturers strengthen their global competitiveness. Recently, however, this system has been changing to reflect the structural sophistication of Japanese industry. This change is accelerating during recession when car makers, machine manufacturers and other large Japanese companies are suffering from sagging demand and decreased earnings. There is great pressure on sub-contractors to reduce unit cost, because, if they do not comply, they can be excluded from the keiretsu. Because of this, many are seeking their independence and are trying to recruit new partners.

Associated with the Japanese approach is the constant attempt to maximize customer service, and relate this to quality. This is accomplished through positive attitudes
towards the workforce, which again is in stark contrast with the West.

According to Rehfeld[11, p. 121], part of the art of motivation in Japan is the payment of bonuses. These are often related to value added, an example being that employees are paid for 12 months, plus four to five months salary as bonus, which is distributed twice a year and is dependent on the level of business. Some Western observers perceive that the bonus system is an illogical practice but, in fact, as shown by Grayson and O'Dell[12, p. 159], the Japanese employees appear to like it. From the management's point of view, they form an incentive for better performance. For the unions, they help to demonstrate their negotiating skills.

Also, the workforce is encouraged to get more involved. In many small companies, top management provide an information briefing of at least 30 minutes on a weekly basis. Apart from quality control circles, which are now almost taken for granted, the Japanese productivity movement is also characterized by staff ideas schemes or the suggestion box approach. This has greatly benefited companies and has enabled workers to express ideas on improving either their own work or management practice. It is claimed that small companies receive over one improvement suggestion per worker per month, with roughly half the ideas submitted being implemented.

The Japanese philosophy of paying attention to productivity and quality appears to have also permeated down to small organizations in the manufacturing sector. It is underpinned by the strong belief that the two most precious resources are people and time.

**Corporate productivity management**

Productivity and quality, coupled with customer satisfaction, are major objectives of Japanese corporations. These are related to long-term profitability, bearing in mind that most profits are ploughed back into the company, with little distribution to shareholders. The attitude of top Japanese management tends to be towards an increase in market share for their product or service compared with the West, concentrating on return on investment and share price. The Japanese perspective in business, as in life, is in the long term.

The linking of productivity and quality to market share and long-term profitability manifests itself in two ways. First, it is shown in the obsession towards value-added productivity; and, second, it is reflected in the high price earnings ratios of most quoted companies.

Much of the literature produced by the Japan Productivity Center and its continental cousin, the Asian Productivity Organization, is dominated by labour productivity and its relation to value-added productivity, as advocated by Shimizu et al.[13]. However, value added is not a real measure of productivity, because it is based on an adjustment of sales which can be distorted by accounting practices and would not truly reflect productive effort. The great interest in this area in Japan is generated by the participative and gain-sharing approach of both management and unions.

The Japan Productivity Center has indeed produced a model based on value added to aid in the distribution of productivity gains. The Nippon Telegraph & Telephone Corporation, which was privatized in 1985, has a considerable management thrust in total factor productivity which is similar to value added. Other large corporations, such as Kawasaki Heavy Industries, are substantially controlled by various indicators, including value added, quality and a morale index, with the latter being related to the number of individual and group suggestions.

There is much interest and effort being presented by academics and organizations into more sophisticated measures of productivity, such as by Kurosawa[14, pp. 73-5]. He underlines some of the Japanese thinking towards productivity and puts it in a logical structure. One of his main self-explanatory analytical ideas is reflected in his transformation process and productivity model (Figure 4).

In relation to measures of achievement, Kurosawa[14, p. 53] also developed a formula to realize corporate potential capability (Figure 5), based on an idea originally put forward by Beer[15].

This approach is the philosophical basis of the relationship between capacity utilization (realized output/potential output) and total productivity, measured in unit cost. It provides the long-term view of what the productivity system should be able to achieve. Such an analysis would highlight the decisions by management to focus on short-term targets while jeopardizing the continued viability of an organization.

**Productivity in Japanese management control systems**

Compared with the West, the Japanese productivity movement is closely allied to management accounting for decision-making purposes. This keenness to utilize accounting information is commendable, considering the lack of accountants in Japan. However, as most Western business economists would point out, accounting information is designed mainly for accounting and reporting purposes rather than for decision making. A comprehensive discussion of Japanese management accounting is given by Bromwich and Bhimani[16]. They
show that management accounting systems in Japanese firms are used more for motivating employees to act in accordance with long-term strategies than to provide senior management with precise information. They reiterate that cost data are not significant in determining product prices for a large segment of Japanese organizations because target prices are based on the potential of the market. This analysis reflects the earlier views of Hiromoto[17].

Computerized systems, often complex, tie in closely with the Japanese productivity pulse which is on labour productivity and value added. For instance, Yokogawa Electric Corporation employs a sophisticated total system which incorporates control information and relates it to corporate objectives, such as:

- quick and correct decision making;
- improved logistics;
- world leadership in quality, lead time and cost.

A powerful strategic information system, relating to productivity, is the MATPLAN/6000 Series (MATrix System for PLanning and ANalysis), developed by Toyama et al.[18] within the Open System Center of IBM Japan Ltd. It is an integrated decision support system which gives quick response to environmental or productivity changes. It also shows the interrelationship between the various factors leading to corporate objectives, such as profitability and market share. This innovation uses structured matrix methodology, from which the end user may obtain the highest visibility and flexibility in management decision making, especially in relation to productivity. It appears to be a powerful tool and could lead to a new methodology of system development as well as new applications in an age of increased parallel processing. Considerable detail is given using standard management accounting and costing information. The system itself is creating wide interest in productivity planning and management, especially in such areas as utilization of resources, scheduling and logistics. As expected, the Japanese are very keen on computerized management control systems.

In the area of work measurement and method study, the Japan Management Association is closely linked with American and European companies. It often adapts programmes and systems to make them suitable for the Japanese market. Such systems include most work management systems of H.B. Maynard & Co. Inc.,
Supercapes and E-Capes of Hewlett Packard and SD-Sicon Ltd. In these areas and in their own style, the Japanese are utilizing western systems and technologies in an attempt to bridge the gap which they acknowledge exists in their work measurement portfolio.

**Productivity and operations strategy**

Japanese industry is only really interested in strategy at the top management level. It is felt that to display too much corporate strategy may leave the organization vulnerable to competitive attack. However, they do possess three operations strengths, competing:

1. on quality;
2. on productivity; and
3. on new products and processes.

The most prominent approach for Japanese long-term productivity thinking is in the field of continuous improvement (kaizen). Productivity is seen as a comprehensive holistic phenomenon, encompassing all elements required to improve products and services. This includes the satisfaction of customers as well as the optimization of resources and inputs. A "pull" approach has been developed so that organizational effort is linked to, and driven by, customer needs rather than being a "push" by management.

Long-term thinking on productivity focuses on the simple output/input relationship. Japanese success can be attributed to:

1. output factors:
   - investment for high technology, modern factories and facilities;
   - investment for new product development;
2. input factors:
   - skilled labour;
   - physical resources.

The Japanese features of labour are dominated by motivation and stability. These are based on four major influences:

1. life-time employment;
2. seniority;
3. intra-company labour unions;
4. high level of average skill.

With regard to physical resources, the important elements include their optimal use, waste reduction, and the utilization of modern, clean and environmentally acceptable technology.

Productivity improvement is not considered in isolation. Japanese corporations ensure that they make productivity a way of life, an objective consisting of basic elements. Each organization translates these into an action plan which relates to its own corporate culture. There appear to be eight success ingredients in the long-range planning of productivity:

1. commitment of top management and unions;
2. understanding of the productivity needs of the organization;
3. creation of a productivity culture towards continuous improvements (kaizen);
4. creating a communication mechanism;
5. modernizing technology;
6. counselling and development of human resources;
7. gain-sharing;
8. productivity integrated into corporate planning.

The long-term goals of major, and of many smaller, corporations are: a challenge to employees; a concern for their welfare on the part of management; and the maximization of customer satisfaction. With regard to the latter, some companies have developed a customer culture within the organization by encouraging their workers to treat their peers as customers. This approach is claimed to heighten general awareness of the standard of quality and type of service expected. It can also lead to an appreciation of the role of each department within the organization.

**Will Japanese productivity ideas work in Europe?**

When asked if Japanese productivity management systems differ from those of the West, Mr T. Fujisawa, co-founder of Honda Motors, states that Japanese and Western management systems are 95 per cent the same, yet differ in all important respects. It is vital to understand that the Japanese, as a nation, have had one fundamental goal since 1945. This is full employment through industrialization. To achieve it, the strategy employed was to obtain market dominance in very select product segments. They painstakingly chose those industries in which they strongly believed they could concentrate and competitively succeed. The implementation of these tactics was governed by two fundamental concepts: the respect for people and the elimination of all waste.

Lorriman and Kenjo[3, pp. 37,80,106] claim that Japan's three winning margins are education, management and the commitment of employees, as well as training. With regard to corporate performance, these can be linked with:

- the import of technology;
- the concentration on operations to achieve high productivity and low unit cost;
the commitment to improve product quality and reliability to maximize customer satisfaction.

Although many of the techniques employed would be difficult to implement in the West, such as lifetime employment, some of the other major elements are, and have already been, implanted. These include customer-led quality improvement, group technology, minimizing set-up and lead times, and the *kanban* system, all embracing the JIT philosophy. These are probably the most important in that they are appropriate and practical as well as being within the European capability to apply and implement. One of the main reasons for their appropriateness is that most of them had their origins in the West. Toyota have been using JIT for over 20 years and claim that they gained the idea from none other than Henry Ford.

There is a myth that high Japanese productivity results from unique cultural factors, which are, therefore, not transferable. This is perhaps exaggerated. Many Japanese productivity practices were derived out of necessity rather than being part of their culture. As Toone[19] suggests, it is important not to confuse company and national culture. He believes that Japanese companies starting up operations in the United Kingdom have not attempted to impose Japanese culture on the British workforce, but instead have attempted to alter their behaviour and habits. Grayson and O'Dell[12, pp. 301-10] list the following five productivity strengths of Japanese industry:

1. The single most important source of Japanese productivity growth is the emphasis on learning.
2. There is rapid adjustment to changing conditions.
3. Japan's drive is a competitive strength.
4. Japan is a less adversarial society than the West.
5. Productivity and quality are stressed to a greater degree than in other nations.

In the United Kingdom, Japanese productivity can be transplanted with success, as witnessed by Yamazaki Mazak United Kingdom (YMUK) and Nissan. The secret behind their effectiveness can be traced through the use of the very latest technology, the harmonization of the best in Japanese and British work practices, and the well-developed working relationships with suppliers. Both these manufacturing operations are claimed, by their Japanese owners, to be of world class. Also, Murata and Harrison[20] describe the same success for Yuasa Battery (UK). Bromwich and Inoue[21] give insights into the ease of transfer of Japanese management control techniques into their British and American subsidiaries.

There are definite challenges in introducing Japanese management ideas into a European context. The fundamental comparative features with regard to productivity and quality management are summarized in Table I.

However, the interest and gradual introduction in Europe of JIT and total quality management (TQM) indicate that Japanese-led productivity ideas can be transplanted. Productivity improvement programmes and their step-by-step approach can be utilized, as advocated by Heap[22]. This is further illustrated by the fact that Lucas Engineering & Systems have been recruited to develop world-class manufacturing standards, based on Japanese management principles, among British industrial managers.

**Conclusion**

Japan, like the rest of the world, has been greatly hit by recession since 1990. Although many Japanese industrial leaders do not openly say so, they are now experiencing many problems familiar in the West. Rekfeld[11, pp. 230-31] advocates that some of them are handicapped by the arrogance that too often grows out of success. He also suggests that success has changed Japan and many top executives spend less time listening and learning and more time talking and lecturing. Today, they are facing

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**Table I. Comparative features of Japanese and European management**

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<td>The philosophy</td>
<td>Culturally inherent</td>
<td>Performance related</td>
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<td>The concept</td>
<td>Continuous improvement</td>
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<td>The focus</td>
<td>Quality/customer satisfaction</td>
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<td>Setting of targets</td>
<td>Top management oriented</td>
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<td>Productivity measurement emphasis</td>
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the decline in work ethic, especially among the young, and the new breed of worker – the shinjinru (or “new people”) – has appeared. As Cole[23] relates, Japanese companies are finding that they can more effectively recruit younger workers if they promise them shorter working hours. Sheer unquestioned obedience is being challenged. It may be, as Brown et al.[24] point out, a reaction against karoshi, death from overwork, which is estimated at 10,000 cases a year. However, as Levy[25] illustrates, in spite of the current downturn and possible ending of the economic “miracle”, Japan’s great strengths still lie in manufacturing, research and development as well as their methods of finance.

Average Japanese citizens are doubting the one-time prudent approach

Some of the basic tenets of Japanese productivity are being questioned, such as lifetime employment. Nissan, as well as Nippon Telegraph & Telephone, have announced phased workforce reductions. With large corporations making losses, more attention is now being paid to profitability rather than market share. The average Japanese citizens, who had been making considerable sacrifices and had invested for industrial growth, are finding their capital decreasing and are doubting the one-time prudent approach.

With government guidance and the leadership of such organizations as the Japan Productivity Center, the Japanese have always proved to be most resilient, as they were after the 1973 oil crisis. They seem to perform at their best with a sense of crisis. An example is Nissan’s intention to fight back and compete by a 10 per cent annual improvement in factory labour productivity, coupled with more efficient use of corporate human resources. Andersen Consulting[26] claim that the recession in Japan does not seem to have damaged productivity. They reveal that the Japanese manufacturing plants, which took part in both their 1992 and 1994 studies, showed a 38 per cent jump in productivity, which was due partly to major restructuring and partly to process improvements. This was despite a 15 per cent decline in volumes.

To overcome today’s challenges, Japan is turning its attention to known weaknesses, such as the service industries, logistics and agriculture, where the Japanese realize that they are lagging behind other countries. They are also shrewdly investing in both manufacturing and service industries in Europe, USA and newly emerging industrialized nations such as South Korea, Taiwan, and even Southern China.

The brilliance and strength of Japanese productivity management is that they pride themselves in being one step ahead. This is supported by Jackson[27] who states that it seems that no sooner does the competition catch up with one idea or one way of doing things, than Japanese companies have already moved on to something else. They will devote investment and ingenuity to that approach. The overriding lesson to be learned from Japanese productivity is attention to detail, commitment, mutual respect and co-operative spirit, as well as discipline. Above all the industrialized nations, Japan understands and appreciates the close link between productivity and quality.

References

Alan Stainer is Head of Engineering Management at Middlesex University, London, UK, Fellow of the World Academy of Productivity Science, and Founder-Director of the International Society for Productivity and Quality Research.

**Application questions**

1. Discuss the relationship between education, training, productivity and quality.

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**Erratum**

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Owing to an error in the production of the above issue the name of an author was omitted from one article.

The authors of the article, “Implementation considerations for activity-based cost systems in service firms”, pp. 57-63, are Kjell Berts, an Authorized Accountant at Ernst & Young, and Sören Kock, Associate Professor in Marketing at the Swedish School of Economics and Business Administration, Vasa, Finland.

The Editor and publisher sincerely apologize for this error.