

**MOVING FORWARD - ASSESSMENT OF COMPETITIVE STRATEGIES AND
BUSINESS EXCELLENCE IN THE TURKISH MANUFACTURING INDUSTRY:
A BENCHMARKING STUDY*¹**

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EXECUTIVE SUMMARY

Moving Forward: Assessment of Competitive Strategies, Business Excellence and Technology Management in the Turkish Manufacturing Industry: A Benchmarking Study aims to explore the state of business excellence in the manufacturing industry in Turkey and to draw some conclusions concerning possible near future developments. It is based on several sectoral benchmarking studies conducted in the manufacturing industries in Turkey.

Business excellence is about competition at the company level and thus needs to be studied in the context of competition. Among the various approaches used in the studies on competitiveness, the engineering approach provides a different means of describing and measuring competitiveness. It defines the companies' capacity to compete as their ability to search for, identify, and assimilate best practices. Best practices are defined as the industry, country, or worldwide practices related to customer focus, quality, flexibility, cost, innovation, and responsiveness that yield superior performance. The continuous effort of seeking best practices should be intertwined with the building of competences. Competition for an enterprise is indeed about deciding upon and building the right set of competences. Sustainability of competitiveness depends on the company's success at developing its competences together with the skills and commitment of its staff. Engineering approach assumes that the competitive ability of a country or region is the combination of competitive abilities of individual companies in that country or region. It is argued that, proliferation of best practices within the sector will improve the performance, and consequently the competitiveness of the sector as a whole. This study subscribes to the engineering approach.

A methodological question is how to measure and to assess the competitiveness of an enterprise. Competitiveness is measured usually in financial and economical terms. In as much as economic and financial data have a number of limitations in that they are at a high level of aggregation and often use proxies for managerial inputs and outputs, an alternative means of

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examining competitiveness is to study the drivers of competitiveness: the operational practices and outcomes of individual enterprises. This way of examining competitiveness forms the methodological base for the sequence of sectoral benchmarking studies leading to this report.

The study of competition is an important issue not only for the companies but also for the governments. Creation of new employment is a primary socio-economic problem of governments in Turkey and elsewhere in the world. Not only is the population of Turkey relatively young and a large percentage of it is in the employment pool, but also the relatively fast urbanization process brings large and mostly unskilled persons into the labor market. Technological change is fast compared to social change, but both are faster than the political change. This is one of the hindering factors in building structural competition. With the pace of technological change increasing, the consequences of this widening gap become even more alarming.

This study is based on the findings of two different kinds of exploratory studies conducted in Turkey. One is a series of sectoral benchmarking studies on competitive strategies and business excellence covering 82 companies in the electronics, cement, automotive, appliances part and component (p&c) manufacturing sectors. The second kind of studies look into the technology management and new product development processes in the electronics and automotive p&c manufacturing sectors covering 49 companies.

The sectoral benchmarking studies on competitive strategies and business excellence have been realized with the cooperation of the Association of Turkish Industrialists and Businessmen (TÜSIAD), the Association of Turkish Electronics Industrialists (TESID), the Association of Turkish Cement Producers (TÇMB), the Association of Automotive Industrialists (OSD), the Association of Appliances Part and Component Suppliers (BEYSAD). The exploratory studies on technology management and new product development process have been conducted in cooperation with TÜSIAD, TESID, Turkish Technology Development Foundation (TTGV), and Association of Automotive Part and Component Suppliers (TAYSAD).

Technology changes at an increasing pace and technology access gets easier in the global sense. All these make the technology arena one of the major battlefields for the companies. Due to the importance of technological innovation and new product development for competitiveness, the results of two further studies covering these areas in two different sectors of the manufacturing industry and conducted in the same time frame (1997-1999) are also included in this study to support the sectoral benchmarking studies on business excellence. The objective of these studies is to investigate the technology management and new product development processes

more closely in order to draw conclusions as to where the industry stands relative to global best practices.

MODEL BASE AND THE QUESTIONNAIRES

In this study, we have made use of data gathered through the implementation of three different questionnaires: Competitive strategies and business excellence questionnaire; Technology management questionnaire; and New product development capability assessment questionnaire. In the development phase of the questionnaires, three steps are followed: *preparation*, *testing*, and *finalization*. The prepared questionnaires are discussed with the surveyed companies to test the clarity, completeness and compliance of questions. Finally, they are revised in response to the feedback obtained.

Implementation of the Questionnaire

Two approaches have been employed for implementing the questionnaires. For the electronics, automotive, and cement sectors, the questionnaires have been distributed to a set of companies preselected jointly with the respective Association. Inquiries of the companies on certain items in the questionnaires were answered by phone and fax. Telephone traffic followed to ask the companies for the filled-in questionnaire forms. For this kind of implementation, we have achieved return rates of 60% for the electronics, 56% for the automotive and 64% for the cement sectors corresponding to 27, 10, and 25 companies respectively. Structured follow-up interviews and site visits have been made in several companies in each sector.

In the case of appliances p&c (20) and automotive p&c sectors (21), member companies preselected jointly with the respective Association have been approached for their approval to join the study. To those companies who agreed, the questionnaire has been explained either by a site visit or in small group meetings of companies. Structured follow-up interviews and site visits have been conducted after the return of the filled-in questionnaire forms. In hindsight, we can conclude that the second approach is the more effective one.

COMPETITIVE MANUFACTURING STRATEGIES

Manufacturing strategy formulation process requires making three strategic choices: selection and implementation of *competitive priorities*, *manufacturing objectives* and *action plans*. Competitive priorities indicate the relative importance of competitive capabilities. Once the competitive priorities are set, measurable performance targets should be established. These targets refer to manufacturing objectives, which are identified to support the envisaged competitive priorities.

To achieve the established set of manufacturing objectives, in turn, the management should develop improvement programs; in other words, action plans; to be implemented in near future. The ultimate outcome of this process is expected to be a positive contribution to the overall business performance.

Companies are asked about their competitive priorities, manufacturing objectives, and action plans which will *be valid for the company for the coming two years.*

For each sector, the companies ranked the first five competitive priorities out of a list of 15 candidate competitive priorities. The list is comprised to include various aspects of supply chain: product, production, and marketing. It is customer focused in the sense that many of the competitive priorities in the list are marketplace related with some reflecting performance in the marketplace. Only a few of the priorities represent internal measures.

The companies have indicated their top five ranking manufacturing objectives from a complete list of 15 manufacturing objectives. The manufacturing objectives cover all components of the supply chain. Profitability and market share are included in the list to reflect the role manufacturing should play in the formulation of the business strategy. Care is taken to restrict the choice of manufacturing objectives to those whose associated attribute can be expressed in quantitative terms allowing the management for target setting.

The companies have selected 10 action plans out of a list of 35 action plans. The list is comprised to include action plans in support of the 15 manufacturing objectives mentioned above. The list is kept rather broad in order to end up with a list general enough to be applicable to all sectors of industry.

The results of the rankings by the companies are indicated below.

Competitive Priorities	Manufacturing Objectives
Consistent quality level	Decrease unit cost
Reliable products	Increase market share
Low price	Increase conformance quality
Rapid design change /new product introduction	Decrease new product development time
Dependable deliveries.	Increase production rate

Action Plans		
Quality	Production	Organization
TQM	Just-in-time production	Restructuring
Zero defect	Production automation	Employee empowerment
Quality certificates for products	Aligning customer needs and product development	
Quality improvement teams	Developing new processes for new products	

These competitive priorities are valid in general over all sectors. *Low price* does not imply cheap products but relatively lower prices compared to the roughly equivalent competing products in the market. This short list indeed reflects the rules of the game expected by the companies to become prevalent in the market in near future. You have to manufacture reliable products with not only good but also consistent quality, to market them at relatively low prices, and to deliver them on time and meeting further requirements of the customer.

The fact that *rapid design change / new product introduction* has appeared as a competitive priority implies that companies to a large extent have come to understand importance of it as a competitive capability and the need to develop that capability. For some companies, especially for a large number of supplier companies, this process implies new product introduction into the product base of the company or a design change on an already existing design where some outside source provides the original design. For these companies, this process consists mainly of preparation for production and launching full-scale production. Hence, it is closely related to rapid delivery.

An interpretation of the result stated above is that, in general, the manufacturing industry in Turkey bases its competition strategy on low price rather than product differentiation.

The agenda of the manufacturing industries in Turkey is to be able to manufacture quality products at low costs. This requires the creation of an environment by the management conducive to the mutual support of quality and productivity. Learning and problem solving are two essential capabilities of companies operating in such an environment where best practices are not only sought for but also adopted and improved upon.

Growth is a primary target for many companies trying to establish themselves in the market place. The companies want to grow through increasing their sales by becoming more competitive. *Increasing market share* is expected to lead to further decreases in unit cost, which, in turn, will lead the companies to strengthen their competitiveness. Increasing market share implies that the companies will take a more aggressive position in the present and/or new markets with or without new products/models. In a study on the electronics sector in Turkey, a similar result has been obtained for success measures in new product introduction. For both large companies and SMEs, customer satisfaction is the top priority followed by market share and further by sale quantity and amount. Profitability follows next.

A follower of the above three manufacturing objectives is *decreasing new product development time*. This manufacturing objective is emphasized by those sectors which have stated *rapid design change / new product introduction* as a competitive priority. The manufacturing objective of increasing

production rate is mainly related to the objectives of decreasing unit cost and increasing market share.

In general, the above action plans are along the lines of the competitive priorities and the manufacturing objectives stated above. The above ten most preferred action plans can be grouped in the general areas of *quality*, *production*, and *organization*. It is interesting to observe that the action plans in the top ten list show a balanced distribution among these areas.

Quality:

TQM turned out to be by far the number one action plan preferred by the companies. *TQM* is defined as an action plan to produce and deliver commodity or service which are conforming with customers' needs or requirements by better, cheaper, faster, safer, easier processing than competitors with participation of all employees under top management leadership. As this definition implies, *TQM* is a broad program, which has to be implemented concurrently with some other quality programs.

Aiming for *zero defect* should be seen as a supportive action plan for securing consistent quality levels. It reflects the desire of the companies to reduce variability in manufacturing processes and products.

Obtaining *quality certificates for products* is also stated among the preferred action plans. Almost all of these plans for obtaining quality certificates for products aim at international certificates for the purpose of facilitating the export of those products.

Quality improvement teams constitute an important indicator for how well *TQM* is diffused throughout a company. That this action program is part of the short list is an indication that some of the companies are aware of and want to alleviate the negative impact on quality of the low level of employee participation in current quality activities.

Production:

Both automotive and consumer electronics sectors emphasize *just-in-time production* as part of the cost reduction schemes whereas for the cement sector it is a necessity due to the perishable nature of cement. Just-in-time production applied properly has a considerable impact on cost reduction by reducing the inventories at all stages of production. It can only be developed on a solid quality basis and thus is closely related to *TQM* efforts.

Production automation supports in a direct way the manufacturing objectives of increasing production rate, increasing direct labour productivity, and reducing labour costs. It is also in line with the aspirations of the companies to increase their market share. Automation might require a significant amount of investment. In order to attain higher levels of capital productivity, automation needs to be built on a sound infrastructure so that sufficient benefits will be realized

to balance the cost. Such an infrastructure is best provided by the emphasis on *TQM*, training, employee empowerment, and quality improvement teams already observed among the more popular action plans in this study.

The action plan of *aligning customer needs and product development* is associated with companies having some form of product design activity. *Aligning customer needs and product development* has a positive impact on the effectiveness and efficiency of new product design process and improves the chance for success of the new product in the market. Currently, the efforts to achieve such an alignment are not based on a formal procedure.

Not only in the electronics sector but also in all sectors of the manufacturing industry the number of different products and models is proliferating. Hence, the number of new products handled by the companies might increase to keep up with this trend. Here, the term *new product* includes also the class of products that are not unique but simply *new for the company*. Manufacturing processes play a major role in securing high quality and low cost products. The search for the best feasible option of manufacturing the new product might lead to the development of new manufacturing processes. Thus, *developing new processes for new products* becomes the action plan to answer this need. This action plan is part of the efforts to achieve a smooth and efficient product initiation process preceding full-scale production.

Organization:

The fact that *restructuring* is strongly represented in the short list indicates the need for organizational innovation. There can be many different environments leading to the adoption of *restructuring* as a remedy. Some of this *restructuring* aims at decreasing the number of layers in the organization. Some of the *restructuring*, on the other hand, is meant to overcome the negative repercussions of fast growth of some of the companies. A major problem appears to be the dilemma faced by family-owned companies. Such companies grow fast but they lack professional management and an organizational framework to respond to that challenge. These companies look a restructuring as a remedy for such deficiencies.

Employee empowerment is another organizational innovation that has been ranked relatively high among the action plans of the companies. Empowerment moves the responsibility down the layers of the organization. It helps to increase commitment and creativity among the employees. This item can be considered as being closely linked to *TQM*. *Employee empowerment* hints to the fundamental change in the attitude of management to the employees and in the practice of human resources management. Obviously, *employee empowerment* is also related to *restructuring*.

BEST PRACTICE SCORECARD OF THE SAMPLE: THE LEADERS AND THE LAGGARDS

The best practice scorecard is constructed to measure the proximity of the surveyed companies to best practice. The horizontal axis of the *best practice scorecard* shows the score on the *strategy & practices index*, and the vertical axis shows the score on the *operational outcomes index*, out of 100. The *strategy & practices index* allows an overall assessment of a company's adoption of the best manufacturing practices related to the planning, focused strategies, factory operations, leadership, people management, customer focus, process and product quality, technology, and benchmarking. The *operational outcomes index* allows assessment of the extent to which these practices has been converted into operational outcomes in terms of cost, quality, flexibility, timeliness, and competitiveness. Each of the 82 companies in the sample is plotted as a single point on the *best practice scorecard* after calculating their individual scores on these indices.

The companies are categorized into five groups according to their relative positions on the *best practice scorecard*. They are identified as *leader*, *laggard*, *medium-performer*, *promising*, or *won't go the distance* companies. A series of statistical analysis are carried out to demonstrate that the categories are in fact different from each other both in implementing best manufacturing practices and in achieving high operational outcomes. The *leader* companies are those that score high on both the *strategy & practices index* and the *operational outcomes index*. These companies not only have the practices in place but also have linked them effectively to achieve high outcomes. On the other hand, the *laggard* companies are those with low scores on both indices, which means that they neither have practices in place not do they achieve high outcomes. The *won't go the distance* companies achieve high scores on the *operational outcomes index*, but low scores on the *strategy & practices index*. According to the *Business Excellence Model*, such companies cannot achieve sustainable high outcomes in the long run without a focus on improvements in practices. On the other hand, although the *promising* companies achieve high scores on the *strategy & practices index*, they have not yet converted their improved practices into outcomes. This situation may simply reflect the time lag between the time the practices have been in place and the time they result in acceptable level of outcomes. The *promising* and *won't go the distance* companies are considered as the outliers according to the *Business Excellence Model*. 82 companies in the sample are divided among themselves as 10 *leaders*, 9 *laggards*, 3 *won't go the distance*, 7 *promising* companies, and 53 *medium performers*.

- *While 60% of the leaders are subsidiaries of parent or holding companies, 78% of the laggards are independent.*

- *Although in the overall sample, the ratio of companies with foreign capital is only 21%, this ratio is 50% for the leader and 11% for the laggard companies.*
- *While 50% of the leaders are large companies, all of the laggards are SMEs.*
- *The fraction of companies with export sales is 80% in the leaders, but 55% in the laggards.*
- *Half of the leader companies have annual total sales more than 100 million USD, compared with 67% of the laggard companies with annual total sales less than 10 million USD.*
- *Neither the implementation of best manufacturing practices nor the achievement of high operational outcomes is affected by the industrial sector the company is in.*
- *Company size affects the adoption of best practice. Large companies are better than medium ones both in implementing best manufacturing practices and achieving high operational outcomes. Medium and small companies do not differentiate themselves from each other.*

BEST PRACTICE ADOPTION RESULTS IN HIGHER BUSINESS PERFORMANCE

- *The leaders in adopting best practice are rewarded by higher business performance. They have accomplished substantially higher values than the laggards in the measures of business performance; demonstrating that best practice adoption has a positive impact on business performance.*
- *The leaders have achieved 20% average annual growth in sales per employee in the last three years compared with 11% achieved by the laggards.*
- *The leaders have achieved 21% average annual growth in value-added per employee in the last three years compared with -1% obtained by the laggards.*
- *Majority of the leaders (75%) have increased their level of cash flow in the last two years compared with 33% of the laggards.*
- *More than half of the leaders (63%) have experienced positive pre-capital investment cash flows compared to only 11% of the laggards.*

IMPLEMENTATION OF STRATEGIES AND PRACTICES

Here we assess the companies in terms of their manufacturing strategies and practices. Transforming an organization to achieve and sustain best practices requires an appropriate manufacturing strategy. Planning, focused strategies and factory operations constitute the

strategies. Practices cover leadership, people practices, customer focus, product and process quality, benchmarking and technology.

Planning:

- *There is a lack of alignment of manufacturing operations with the business mission, in general. Nevertheless, the leaders are more likely to achieve alignment.*
- *The leaders are performing better than the laggards in almost all aspects of planning.*

Focused Strategies:

- *Focused strategy development and implementation appears to be an area open for improvement for the overall sample including the leaders and the laggards.*

Factory Operations:

- *The leader companies, by far, performed better than the laggard companies in adopting best manufacturing practices related to factory operations.*
- *The most important result is that, while majority of the leaders have reported a significant or major contribution resulting from preventive maintenance and quality improvement teams, none of the laggards claimed they even applied these approaches.*

Leadership:

- *Leadership is regarded highly in the industry. This is mainly due to the frequent crises faced by the industry as a whole, thus creating a need for strong leadership to secure the survival of the enterprise. Another reason could be the lack of systems not yet put in place in the companies, thus requiring strong leadership to compensate for this deficiency.*
- *The leader companies, to a great extent, performed better than the laggards did, on the average. Particularly, there are significant differences observed between the leaders and the laggards in the effective use of team spirit and motivation, and in the assurance of unity of purpose throughout the organization.*

People Practices:

- *Two areas of major weakness are the lack of a formal and regular process for the measurement of employee satisfaction and the lack of an organization-wide training and development process, including career path planning.*
- *The leaders are significantly better than the laggards in almost all aspects of people management. Another significant difference between the leaders and the laggards is observed in relation to the extent organization-*

wide training and development, and career path planning are employed by these companies. However, the leaders fail to differentiate themselves from the laggards in the practice of developing human resources plans that focus on the core skills and competencies required to manufacture competitive products.

Customer Focus:

- *In general, there is a widespread and keen awareness of the importance of customer focus.*
- *Almost all of the companies, which claimed that they have effective processes for resolving customer complaints, are using customer complaints effectively to initiate improvements in current processes. On the other hand, less than half of the companies systematically and regularly measure customer satisfaction.*

Product and Process Quality:

- *Almost all of the companies in the sample have site-wide standardized and documented operating procedures, and methods to measure the quality of their products and services. This can be attributed to the diffusion of ISO 9000 certification in the industry since these practices constitute the essentials of certification process.*
- *The percentage of companies with one or more quality certificate such as ISO 9000 is 60 in the leaders and 22 in the laggards.*
- *Majority of the companies, be a leader or a laggard, claimed that all of their employees believed that quality is their responsibility.*
- *All of the leader companies stated that their employees had a clear understanding of internal customer concept compared to a very small percentage of the laggards who can make such a claim.*
- *The lowest scores are in the areas of quality improvement teams, statistical process control, warehouse management, and machine set-up time reduction indicating these areas to be clearly open for improvement.*
- *The leaders performed far better than the laggards in working closely with their suppliers in product or process development but their performance cannot be judged as satisfactory either. Thus this point is open to improvement for all companies.*
- *One of the more importing findings of the analysis is that the companies in the sample have poor supplier relations. While majority of companies recognized a strong customer focus is essential, far fewer attached importance to relationships with their suppliers.*

Benchmarking:

- *Despite the fact that benchmarking is reported as widely practiced, interviews demonstrated that the concept is far from being uniformly understood. Furthermore, majority of companies they practice benchmarking, do*

so at the simplest possible level. These findings suggest that practice of higher levels of benchmarking is not diffused among the companies in the sample.

Technology:

- *The leaders are much better than the laggards in that their core manufacturing technology is appropriate to their business needs and that they utilize their manufacturing technology to its maximum potential.*

ASSESSMENT OF OPERATIONAL OUTCOMES

The companies' operational performance is assessed in terms of cost, quality, flexibility, timeliness, and competitiveness. Assessment of operational performance is conducted in terms of customer satisfaction, employee morale, process changeover time, productivity, and technological competitiveness; delivery full on time, proportion of production operators involved in process improvement or problem solving teams, and proportion of quality control inspectors to direct operators.

- *Meeting customers' requirements and expectations is a broad indicator of customer satisfaction. However, more than half of the companies in the overall sample declared that they occasionally fail to meet customer expectations. Though, the leaders differentiate themselves from the laggards in that respect, it is deemed to be unsatisfactory.*
- *Employee morale is an indicator of employee satisfaction. Less than half of the companies in the overall sample reported high levels of employee morale. All of the leader companies reported high level of employee morale compared with the one-tenth of the laggards.*
- *Value-added per employee is a widely used indicator of productivity. All of the leader companies reported that their level of productivity is consistently improving and they gained significant benefits, compared with one-third of the laggards. In the overall sample, quite a large number companies stated that their level of productivity needs improvement to some extent.*
- *Average process changeover time is one of the indicators of flexibility. It is the time required to change a specific machine, work center, or line from making the very last piece of product to the very first piece of another different product. It may include the run and inspection time for the first piece. Two-thirds of the companies in the overall sample argued that their average process changeover time needs improvement to some extent. Although, the leaders are much better than the laggards in that respect, still 40% reported a need for improvement.*

- *Committing to remain technologically competitive is a necessity for manufacturing companies to ensure continuous improvement in their production systems. All of the leader companies reported that they have advantages over competitors or that they are technologically leaders, compared with only one-tenth of the laggards. In the overall sample, 45 per cent of the companies believed that their relative level of technological competitiveness is on par or behind competitors.*
- *Four-fifth of the companies in the overall sample reported that more than 90% of the time, they deliver orders full and on time, which is a success. The leaders far outperform the laggards in that respect.*
- *One-fourth of the companies in the overall sample reported the ratio of quality control inspectors to direct production operators as between 10% and 20%, which is quite high. Despite the fact that, the leaders are far better than the laggards in employing less quality control inspectors, this ratio needs to be decreased further.*
- *Half of companies in the overall sample reported ratio of production operators involved in process improvement or problem solving teams as less than 5%, which is very low. The leaders are clearly separated from the laggards in that respect.*
- *Employee involvement in quality improvement activities is still a recent issue for the surveyed companies. To become a world-class company, it is essential to involve employees in the pursuit of improvement goals.*
- *In general, despite good intentions and long term initiatives in implementing best manufacturing practices, companies are not yet very successful in converting their practices into improved operational outcomes.*

COMPARISON WITH COMPETITORS

Competitiveness is relative in the sense that your competitiveness is not only determined by your own performance but also by the performance of your competitors. A careful analysis of the advantages and disadvantages relative to competitors constitutes an essential part of competitive strategy formulation process. The results of such an analysis is deemed to be very useful in assessing a company's competitive position relative to its competitors.

In the study, companies are required to assess their performance on some competitive factors relative to their domestic and foreign competitors, considering the Turkish market. While competitors having manufacturing sites in Turkey are called *domestic competitors*, competitors having manufacturing sites outside Turkey are called *foreign competitors*.

Against foreign competitors:

- *Relative to foreign competitors, although there are some factors on which companies rate themselves as advantageous or on par, they generally consider themselves in a disadvantageous position.*
- *Relative to foreign competitors, ability to adopt product and/or volume changes rapidly remains as the key advantage. The companies consider themselves more flexible in the above sense relative to their foreign competitors.*
- *Customer service is considered as an advantage relative to foreign competitors. Since the comparison is made considering the Turkish market, being close to the customers might be the primary reason for the relative advantageous situation with respect to foreign competitors.*
- *Order to delivery cycle time is a widely used indicator of delivery quality. In general, order to delivery cycle time is not considered to be a point of superiority. Relative to foreign competitors, 60% of the leaders reported lower cycle times, compared with 33% of the laggards. Moreover, the leaders are performing far better than the laggards in comparison to their competitors.*
- *A notable finding is that the traditionally held view of having low unit production cost as an advantage seems to be unfounded. In the overall sample, 51% of the companies reported lower total cost per unit of product relative to their foreign competitors. While more than half of the leaders thought that they had cost advantage relative to their foreign competitors, the laggards thought that they had cost advantage especially relative to foreign competitors.*
- *In the overall sample, only 21% of the companies reported that their finished product defect rate is lower than that of foreign competitors, which implies the admission of a gap. It seems to be a valid gap also for the leaders. Yet, larger percentage of the leader companies think that they are more advantageous relative to their competitors*
- *Companies rate themselves to be in a disadvantageous position particularly in lost capacity due to production downtime against their foreign competitors. However, this is the single performance outcome that most clearly separated the leaders from the laggards.*

Against domestic competitors:

- *In general, companies assess their level of performance as either on par or above their domestic competitors.*
- *Companies assess their level of performance almost equal to their domestic competitors on lost capacity due to production downtime and on order to delivery time. They consider themselves slightly advantageous in finished product defect rate and slightly disadvantageous in unit cost of product.*
- *Customer service is considered as an advantage relative to their domestic competitors.*

- *In the overall sample, 38% of the companies reported lower total cost per unit of product relative to their domestic competitors. While more than half of the leaders thought that they had cost advantage relative to their domestic competitors, the laggards thought that they had cost advantage relative to their domestic competitors.*

Regardless of industrial sector, the companies seem to have problems mainly in the areas of:

- *New product development,*
- *Marketing capability,*
- *Logistics. (Warehousing, ability to access incoming materials, production planning and control, material management are thought to be the four disadvantageous factors in the area of logistics.)*

TOTAL QUALITY MANAGEMENT - TQM

The companies have specified quality as the outcome having the biggest impact on their success. Quality turns out to be the most important supplier selection criterion for manufacturers. The survey results, on the other hand, indicate to areas of considerable improvement in the quality domain. The companies seem to be aware of this situation. When shaping their strategies, policies and plans for the near future, they have specified *consistent quality level* as the top competitive priority, increasing *conformance quality* as the third manufacturing objective, and *TQM* by far the most popular action plan with several other quality tools included in the list of action plans to be adopted.

- *All the above observations lead to the conclusion that the manufacturing companies in Turkey are aware of the fact that quality is a fundamental requirement for their existence in the market, i.e., a qualifier to enter the market place.*

This basic strategy of manufacturing companies in Turkey is consistent with *the sand cone model* of operations management. Sand cone model puts the approach to business excellence into perspective. According to the sand cone model, a certain capability is not necessarily enhanced at the expense of another capability. Capabilities can be developed in a cumulative fashion. Ferdows and De Meyer state: "To build cumulative and lasting capability, management attention and resources should go first toward enhancing quality, then –while the efforts to enhance quality are further expanded- attention should be paid to improve the dependability of the production system, then –and again while efforts on the previous two are further enhanced- production flexibility (or reaction speed) should also be improved, and finally, while all these efforts are further enlarged, direct attention can be paid to cost efficiency."

- *Sand cone model indeed appears to be of great relevance to the manufacturing industries in Turkey. Thus we can say that, in general, the manufacturing companies are in the process of enlarging the ground layer of the sand cone for further improvement in dependability, flexibility and cost.*

Diffusion of TQM concepts on the shop floor and employee involvement:

- *One-fourth of the companies in the overall sample reported the percentage of quality control inspectors to direct production operators as between 10% and 20%, which is quite high and needs to be decreased further.*
- *Half of the companies in the overall sample reported percentage of production operators involved in process improvement or problem solving teams as less than 5%, which is very low.*
- *Employee involvement in quality improvement activities is still a recent issue for the surveyed companies. To become a world-class company, it is essential to involve employees in the pursuit of improvement goals.*

Use of the self-assessment tool:

- *Use of the self-assessment tool is not widely diffused among the companies. Companies need to employ this tool as an important monitoring and feedback mechanism for success in their TQM journey.*

SUPPLY CHAIN MANAGEMENT

The domain of supply chain management is the extended enterprise. It includes suppliers, purchasing, production, distribution, and customers. It oversees the material flow from the suppliers and through the company to the customers; and directs the information flow in both directions on this chain. Supply chain management is built upon strategic relationships, the application of time-based competitive strategies, and information technology. The relatively high share of material cost and inventory holding cost in the distribution of manufacturing costs indicate to the great possibilities supply chain management can provide for *decreasing unit cost* – number one manufacturing objective adopted by the companies.

Supplier relations:

- *Conformance to technical specs is a qualifier for the supplier companies and so is delivery performance to some extent. Price apparently is the order-winning criterion. The capability to deliver, on the other hand, is tried to be secured by technical competence and experience, production capacity, and ISO 9000 or some form of certification.*
- *A very large percentage of suppliers agrees that certification and training programs of the manufacturers have improved their process and product quality and their delivery performance.*

- *Almost half of the suppliers reported important savings in their costs as a result of such certification and training programs.*
- *The suppliers request from the manufacturers to continue with these programs but with an enlarged scope and increased effectiveness.*
- *Relatively larger suppliers have initiated their own certification and training programs for their own suppliers, thus disseminating the positive results down the tier structure.*

Delivery performance:

- *Four-fifth of the companies in the overall sample reported that more than 90% of the time, they deliver orders full and on time, which is a success.*
- *Manufacturing companies shift the burden of keeping inventories onto their suppliers during the process of just-in-time delivery.*
- *Both the incoming material and the finished goods inventories of the supplier companies seem to have swollen after the introduction of just-in-time delivery by the purchasing companies.*
- *If one of the major reasons for this result is the inability of the supplier companies to adopt themselves to the new environment through operational improvements, the other is obviously the lack of any stability in the purchasing plans of the purchasing companies and the very frequent changes in their orders with very short lead times.*
- *The practice of just-in-time delivery is becoming more common. This puts continuous pressure on the delivery performance of the supplier companies. Thus, delivery performance being a crucial area for the success of supplier companies needs to be continuously improved through innovative measures.*

AN URGENT TASK: BUILDING THE EXTENDED ENTERPRISE

The results reported above have demonstrated the weakness of the interaction among the companies, particularly between the manufacturers and the suppliers. There is evidence that strategic partnership is diffusing among manufacturing companies in Turkey but there is still a long way to go to approach the understanding of an extended enterprise where a group of companies, both manufacturers and suppliers, work together towards providing a product or a service by forming a network of companies.

In an extended enterprise, companies contribute and benefit through their set of core competences. Thus it becomes imperative for Turkish manufacturing companies to define and foster their core competences, which, according to our experience, is not a common practice.

Leadership is expected from large companies in Turkey for pursuing policies aimed at becoming a production base for the world markets in their field so as to give the suppliers in Turkey the benefit of proximity and the opportunity to become part of global networks.

HUMAN RESOURCES MANAGEMENT

An uncountable number of sources discuss the importance of human resources for competitiveness and conclude that human resources is at the center of global competition.

The Issue of Mutual Trust

A fundamental contribution to achieving profits and to the long-term survival of the company is the way it manages its human resources. A basic element is *mutual trust* between the parties involved. Mutual trust is a resource requiring years to build up.

- *A major blow on mutual trust on the side of employees is the employee shedding usually becoming a policy measure taken when the company faces an economic crisis. Another source of loss of jobs for the employees is the introduction into the companies of rationalization measures and of automation leading to structural unemployment.*
- *From the point of view of the company, these might be unavoidable policies to increase productivity and capacity. Both the employers and the trade unions have to devise schemes jointly to reduce the need for and the impact of the implementation of such policies. Obviously, lifetime employment is not a solution but a different concept called lifetime employability can have fundamental impact on the well-being of the employees.*
- *Such measures as the importance given and resources allocated by the management to employee participation, training and development of the personnel, improving occupational health and safety conditions support the trust building process.*

Training and Development of Employees

The rapid pace of change in technology, products, and markets makes training a necessity for the companies. Organizations need to invest more in developing their own people since it is indeed difficult to recruit good quality personnel.

- *In general, the activities of training and development of employees in the manufacturing companies in Turkey expressed in terms of the annual number of training hours and the annual cost of training as a percentage of the employee payroll are relatively low. The issue of training and development of employees is indeed an area open for improvement.*

- *Not only the amount of resources allocated but also how effectively these resources are employed is decisive on the outcome. It is interesting to observe that instructor led classroom training is declining and learning technology is taking over.*
- *A major weakness in the area of training and development results from the lack of an organization-wide training and development process, including career path planning. The resources should be sought for, allocated and implemented according to a plan supporting the training and development process.*

Employee relations:

- *Companies need to introduce some formal mechanism for measuring employee satisfaction.*

Innovation management:

- *The observations made during this study lead us to the conclusion that innovation management is yet to be organized in the manufacturing industry in Turkey. It requires the full attention and the leadership of top management.*

PERCEIVED BARRIERS TO SUCCESS

Financial Factors:

- *High financing cost of machinery and equipment investment.*
- *High financing cost for working capital.*
- *Fluctuations in currency rates.*
- *High national infrastructure costs (especially energy costs).*

Structural Factors:

- *Lack of organizational learning and transfer of knowledge.*

Further barriers to success stated by a relatively smaller number of companies are *lack of common vision and resistance to change due to company culture and values.*

Marketing:

- *Difficulty of reaching global markets.*

THE NEED TO GROW

Increasing market share is the second top-manufacturing objective of the companies that took part in this study. *Growth* is a very crucial problem particularly for the SMEs. Their sizes are small and the domestic market is small. This leads them to accept almost any order from the

manufacturers causing loss of focus. With the global trend of company marriages, the relative size of also the large manufacturing companies in Turkey decreases.

- *The Turkish manufacturing companies, besides trying to become export oriented and trying to become part of extended enterprises, need to look for all different possible modalities to join their resources together with other companies (through joint ventures, mergers, IPOs, etc.) domestic or foreign so as to reach sizes with more chance for sustainable competition.*

Such moves can also alleviate some of the financial, structural, and marketing barriers in front of them.

REACHING GLOBAL MARKETS

Increasing access to world markets is not only a means of securing healthy growth and improved cash flow, but it also has positive impact on the operations of the company as is reported in this study.

Increasing access to world markets is an issue of not only individual companies but there are also measures to be taken by *Governments* to facilitate it. As Turkish companies try to enter into world markets with *Made in Turkey* products, they face difficulties not only due to the quality and performance level of Turkish industrial products as perceived by the foreign customers and consumers, but also due to Turkey's image particularly in Europe – the largest industrial trade partner and the largest and the closest market for Turkey. This is an issue that the Government has to deal with to a great extent. But companies can also play a role to improve the situation. Adhering to high business best practices and ethics can make a difference in that regard.

The Associations also have an important role to play by guiding and supporting companies in their efforts to reach global markets.

It is interesting to note that Turkish industry has yet to create a *world brand name*. Although some Turkish companies have reached capacities at global scale, apparently some further characteristics, and strategies and policies are needed to create a world brand name, which hopefully will appear soon.

Becoming an actor in the global market also helps in reaching production quantities where more economic production can be realized leading to reduced costs. This is particularly true for suppliers. Global markets provide the opportunity of reaching high production quantities also to companies operating in niche markets.

- *An immense opportunity arising for reaching markets is e-business. Any concrete application by manufacturing companies in Turkey in e-business is almost non-existent. A fast and coordinated attack needs to be made in this area. E-business might provide the gate into global markets that the*

Turkish manufacturing companies are looking for. The Associations might play a leading role in the case of SMEs.

INNOVATION AND KNOWLEDGE MANAGEMENT

Innovation covers a broad range from products and services to production, supply, and distribution and further to management, work organization, and working conditions and skills of the workforce. Innovation can be conceived as a creative process aiming to change the status quo in the targeted domain. Innovation and knowledge are the two most powerful tools together with a committed workforce to initiate change.

Innovation management deals with the creation of an environment, which facilitates innovation. Commitment and motivation of the workforce, leadership, employee empowerment, employee participation are essential. An environment conducive to change is needed. Such an environment is a learning environment.

Innovation management is closely linked to *change management* since implanting anything new results in a change in the environment, big or small, leading to a resistance, if not properly managed.

Knowledge management deals with the operation of a process consisting of the phases of identification, documentation, presentation, usage, valuation, protection and scrapping. Note that this is quite similar to the process model we have employed in our technology management survey.

The innovation and knowledge management processes need an owner, which can be a person or a team. In the Turkish manufacturing companies these processes do not exist in an explicit fashion and there is no declared ownership. Companies should develop more explicit and concrete policies towards the creation, continuous improvement and active participation of their most valuable asset, namely their creative and knowledgeable employees.

PRODUCT INNOVATION: A YET UNTAPPED SOURCE

Product innovation appears to be an area that has been neglected considerably in contrast to process innovation. Several reasons can be cited to explain this situation. One reason is that major manufacturers have worked under license and thus did not need to develop their product design capability. This, of course, has also affected their suppliers. Companies mostly operated as blue print applicators and/or resorted to reverse engineering. But still there are successful examples of product design and co-design among the SMEs in Turkey working with Turkish and foreign companies.

In an era where products manufactured in Turkey are subject to global competition also in the Turkish market with the import barriers coming down, product innovation is a means for long-term survival. Product innovation is a must for being able to switch from low cost to product differentiation strategy increasing the added value of the products manufactured.

Again, leadership is expected from large companies in Turkey for the diffusion of product innovation. Increasing product innovation capability of the large companies will definitely have an impact over time on the product innovation capabilities of their suppliers at least through co-design projects.

➤ *For the facilitation of product design improvement, one can easily see the crucial nature of the ownership of design. That a company doesn't own the design can be a major hindering block in front of product design improvement, which then also hinders the competitive capability of the company.*

TECHNICAL AND ORGANIZATIONAL SUPPORT FOR PRODUCT DESIGN

We have observed that the technical support environment for product design is weak in most of the manufacturing companies in Turkey. Methods to be employed for achieving improved designs such as quality function deployment, simulation, and Taguchi methods are relatively less known and employed.

In order to reach the level of an international design partner, there are certain infrastructure requirements to be met. An integrated concurrent design environment should be aimed in order to reach the world standards in time to market. Modelling and simulation are further tools to support the design process.

The organizational support for product design process requires personnel well trained in teamwork and teaming. Multidisciplinary project teams including members from production, marketing, and R&D/engineering departments is a best practice well understood by Turkish manufacturing companies. What needs further improvement is the inclusion of suppliers and customers into the design process.

There are two disciplines that are still at their infancy in Turkey that have a direct impact on the level and quality of design activities. One is ergonomics and the other is industrial design. In both of these areas, particularly in ergonomics, the human resources in the country are not yet at a level to provide support to the design activities in industry. There is an urgent need of collaboration with the higher education institutions to expand and improve their activities in these areas.

BUILDING THE KNOWLEDGE SUPPLY CHAIN

- *While trade fairs and conferences stand out as the major technology source, university laboratories and R&D institutions are distinctively not utilized.*
- *The comparison of R&D expenditures with external equipment and technology purchasing expenditures reveals a great dependence on external technology.*
- *The intensity of activities for technology acquisition as well as for technology transfer is relatively low.*
- *At the national level, on the other hand, R&D expenditures as a per cent of GDP is almost stuck at levels approaching 0.5% for years*

Knowledge supply chain is a concept to be introduced to the Turkish industry, universities, schools and associations. Knowledge supply chain aims at improving the supply and dissemination of knowledge in manufacturing companies. It tries to make use of the experience gained in supply chain management. This time it is not material but knowledge. This is a rational consequence of knowledge being a factor of production and a primary source of competitive advantage. The knowledge supply process is modelled as a pull system providing for the needs of the customer, i.e., the manufacturing company. Obviously, knowledge supply chain requires knowledge management, which is treated above under a separate heading.

Knowledge supply chains can include international entities. Turkish manufacturing companies should systematically strive to become part of global knowledge supply chains. *International R&D and product development activities* imply partnership possibilities in these areas. Similar strategies to becoming part of global extended enterprises can be implemented for becoming part of the global knowledge supply chains. Developing information technology increasingly supports international R&D and product development activities.

The potential impact of correct Government policies on building knowledge supply chains cannot be emphasized enough. The design, building and coordination of a *National Innovation Infrastructure* by the Government can contribute immensely through knowledge supply chains to the competitive power of the manufacturing companies in Turkey. The National Innovation Infrastructure should be considered as a major component of the structural competitiveness of Turkey.

- *All the results of the study indicate that more investment into the knowledge supply chain is required.*

A PARADIGM SHIFT IN MANUFACTURING: FROM PRODUCT TO TOTAL SOLUTION

The concepts of lean enterprise and concentration on core competences leading to the wider and more innovative practices of outsourcing, all have contributed, among others, to the institutional customer's expectation for a total solution rather than a product. With the increasing complexity of everyday life, individual consumers are also inclined to prefer total solutions. Thus, there is a need for understanding and translating customer needs into total solutions presented as *integrated packages of products and services*.

The switch from product to total solution changes the whole nature of customer relationships. A total solution implies a relatively longer interaction time with the customer -a kind of partnership- resulting in a stream of revenues distributed over time.

Total solution requires the contribution of several core competences and as such can only be a product of an extended enterprise. Since we consider becoming part of extended enterprises as a must for the manufacturing companies in Turkey, this implies the importance of focusing and nurturing the core competence(s) of the company. *Distribution* and *service* are two such core competences, which constitute basic competitive advantage for the Turkish manufacturing companies in their struggle against their foreign competitors operating in Turkey.