COMPETITIVENESS IN ENGINEERING AND LIGHT INDUSTRY IN KAZAKHSTAN

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Executive summary

- As Kazakhstan moves towards an increasingly liberalised market economy, and with the prospect of WTO membership within the next few years, *profitability* should be used as the basic indicator of short-term competitiveness.

- Over the medium-to-long term, prospective profitability is more difficult to gauge. It is therefore necessary to seek to assess the factors lying *behind* longer-term, dynamic trends in profitability. The most important of these is *growth in productivity.* Behind productivity trends, in turn, lie trends in general levels of technology.

- On this basis, most of the firms in the engineering-based industries and light industry in Kazakhstan are marginally competitive in terms of the short run. A substantial minority are marginally uncompetitive. In such a situation, it is very difficult for companies to find either the time or the finance for long-term developments. So there is no effective bridge between short-run and medium-to-long-run profitability for most of the companies involved.

- There are significant sub-groups within the targeted sectors which survive only on the basis of heavy subsidisation and/or protection. The most notable of these are agricultural machinery and footwear. These sub-sectors are clearly uncompetitive in current terms. Most of the firms concerned should be closed down or fundamentally restructured, with a view to creating, in time, the conditions for dynamic profitability.

- General levels of technology are assessed on the basis of a simple, three-level taxonomy of goods – simple inputs/components, complex inputs/components and 'specialist supplier goods' (complex goods embodying a substantial element of client-specific design). On the assumption that real wages in Kazakhstan will grow steadily and significantly over the foreseeable future, Kazakhstan firms will be forced to move up this 'technological ladder' to maintain dynamic competitiveness.

- On this basis, a number of the firms of the targeted sectors show clear potential for dynamic competitiveness. *None, however, are fulfilling all the conditions for dynamic competitiveness at the present time.*

- International certification and accreditation are widely perceived by firms in the engineering-based sectors as key factors of competitiveness, and of integration into international networks. While company goals in relation to these matters are clear-cut, firms find it difficult to raise the funds to cover all the forms of certification they need. Domestic standards organisations are not viewed as being particularly useful in this respect. Firms in light industry have a more positive view of domestic standards organisations.

- While the importance of human capital and human capital formation is widely recognised in the targeted industries*, public policy in this area is perceived as*

being highly ineffective, in a situation where the companies themselves do not have sufficient resources to fund all the training they need.

- Companies will not be able to calculate profitability by product without good accountants. So proper assessment of short-run competitiveness may require specific programmes of recruitment and/or training in this area.

- One of the main underlying factors tending to weaken the competitiveness of Kazakhstan companies is a historically-conditioned tendency to isolation, which has effectively excluded networking as it operates in the advanced industrial economies. Originally created by the political isolationism of the Soviet system, this tendency was reinforced by the fragmentation of the Soviet Union. In some respects, it may have been further exacerbated by the import-substitution programme of the late 1990s

- International experience demonstrates that the most important condition for dynamic competitiveness is the *capacity of the firm concerned to learn*. Firms learn from educational institutions, research organisations and government, but above all they learn from *each other.* That is why networking is so important.

- It is also why exporting is so important. Firms learn best of all from foreign buyers, and buoyant international networking creates a framework for strong domestic networking, disseminating the impact of export-led learning throughout the economy.

- Government can best contribute to the process of building dynamic competitiveness through measures which *consolidate the principle of the level playing field.* That excludes large-scale subsidisation and protection, favouritism in relation to government contracts and arbitrary interference in company affairs; it includes measures to promote human capital formation and product certification at firm level. *In the case of human capital formation, however, short-term government actions are currently going against the interests of the companies concerned, and against the principles laid down in the Innovative Industrial Development Strategy.*

- Legitimate government actions also extend to measures to combat the historically-conditioned isolation of Kazakhstan firms. Most obviously, those would include facilitation of participation in trade fairs and exhibitions etc, including purely domestic ones. Less obviously, perhaps, the government should be taking measures to internationalise its management elites – by setting up special courses in business English, supporting managers who want to go on training courses abroad. Most importantly, the government should do everything in its power to encourage commercial contact between Kazakhstani and foreign firms – *but without violating the principle of the level playing field.*

1. Introduction

1.1. The notion of competitiveness is a controversial one in Economics. The traditional theory of international trade and international specialisation is based on the notion of *comparative* advantage. In its Heckscher-Ohlin variant, the law of comparative advantage states that countries will derive greatest benefit from concentrating production in sectors requiring large volumes of the factors of production in which they are most richly endowed. In the case of Kazakhstan, that means concentrating on:

- Sectors based on extraction of primary materials (oil, gas, minerals)
- Sectors based on favourable agricultural conditions (wheat, cotton, cotton-processing)
- Traditional, labour-intensive sectors of industry, based on the exploitation of cheap, unskilled or semi-skilled labour (textile industry)
- Human-capital-intensive sectors based on endowment of skilled labour and R&D capacity (engineering)

Under normal conditions, in a market economy, entrepreneurs and investors will find it most profitable to concentrate on sectors with comparative advantage. So the pattern of international division of labour should be self-equilibrating and self-sustaining.

1.2. In the case of Kazakhstan, the law of comparative advantage finds its clearest expression in relation to raw materials and agriculture. As much as 61 per cent of Kazakhstan's exports originate from the hydrocarbons sectors, 26 per cent consist of metal ores and 5 per cent takes the form of foodstuffs, mainly wheat. The law of comparative advantage comes through much less clearly in the case of categories 3/ and 4/. Only 1.2 per cent of total exports come from the textile industry, while engineering-based industries account for just 2 per cent of total exports, and only a negligible proportion of exports outside the former Soviet Union.[1] The only sub-sectors of engineering to show *revealed* comparative advantage consistently over recent years are bearings and TVs and PCs (assembly) (*Trade Policy Overview*..., 2003, pp.5-6)

1.3. Clearly, therefore, the self-equilibrating mechanism of comparative advantage works only imperfectly in the case of Kazakhstan. In order to understand why sectors with underlying comparative advantage find it difficult to export, why potential comparative advantage does not turn into revealed comparative advantage, we have to turn to the concept of *competitive advantage.*

1.4. Paul Krugman (1996) has rightly pointed out that the notion of competitive advantage is essentially meaningless at the level of whole economies. Indeed the great insight of the Law of Comparative Advantage is precisely that, at some level of wages, even the most poorly endowed economy in the world will always have

[1] Based on figures for 2002. See *Kratkii...*, 2002, pp.127ff.

comparative advantage in something. At the level of sectors and companies, however, competitive advantage is a useful, and indeed necessary concept. It takes good management to translate low wages into competitive prices for final output, even in technologically relatively simply operations like textile manufacture. And in sectors producing highly heterogeneous goods, often with a substantial embodied design element, it is not enough to be competitive in terms of price. On the world market, clothes which are perceived as poorly designed and unfashionable will not be saleable at any price; machines which are considered to be technologically obsolete, or which do not correspond to international standards in terms of safety, environment etc will not be saleable at any price. Finally, goods which encounter systematic barriers on global markets, whether in the form of tariffs or NTBs, may not be effectively competitive, even when all other conditions of competitiveness are met.

2. The technological ladder

2.1. To be useful in terms of strategic planning, competitiveness has to be viewed in a *dynamic* perspective, as a *process* rather than a *state.* Company A may find it profitable to export goods x, y, z in 2003, but if it is to be still competitive in 2008 it may have to learn to export a completely different set of goods. The process can be seen at the level of broad sectors with particular clarity in the case of Korea. Korea began its dramatic industrial development in the 1950s through rapid development of an export-oriented textile industry. By the 1960s, steel was beginning to replace textiles as the main export sector. From the 1970s, Korea started to develop engineering-based export sectors like the automotive industry.

2.2. Why did the structure of the Korean economy change so rapidly? Because conditions in the world economy changed, with countries like Hong Kong emerging as major exporter of textiles, and because conditions changed within the Korean economy. As GDP grew rapidly in Korea, wages grew - to a great extent reflecting the process of accumulation of human capital within Korean society. So Korea was *forced* by the price mechanism to restructure its export economy in such a way as to make best use of an ever-enhancing human capital stock.

2.3. The pattern will be similar for Kazakhstan over the next decade or so. The further integration of low-wage countries like China and Vietnam (and possibly some African countries) into the global economic system will mean new competitive pressures in traditional, labour-intensive sectors. And as the Kazakhstan economy grows, wages in that country will rise. The average annual rate of growth in real wages in Kazakhstan over the period 1998-2002 was 9.5%. If GDP grows in accordance with the Innovative Industrial Development Strategy, that rate of growth of real wages will be sustained over the next decade or so. Thus the underlying pattern of comparative advantage will change. If Kazakhstan companies do not keep up with these changes, then the prospects for sustainable competitiveness will be poor indeed.

2.4. Does that mean that there is no future for sectors like textiles in a developmental context? Certainly Korea (and also Japan) abandoned their specialisation in textiles as they moved into second-stage industrialisation. By contrast, Italy has maintained its specialisation in textiles right through to third-stage industrialisation. It has done

so by developing a very strong specialisation on *designer* clothes - clothes where the skilled labour/human capital input is actually more important than the traditional unskilled/semi-skilled labour input. So you can move from one sector to another, or you can move within one sector. What is incontrovertible is that you *have to change*, and if you do not change, you are doomed to economic failure.

3. The matrix of innovation

3.1. As the understanding of technological processes has improved in recent decades, a number of key analytical distinctions have been developed. Most fundamentally, analysts have found it useful to distinguish between 'hard' and 'soft' technology. Hard technology is the technology of production lines and the artefacts produced on those production lines. Soft technology is the technology of organisation, including the organisation of the information systems that organisation depends upon, the organisation of logistics and the organisation of the management process itself. It is, in a word, the 'technology of the office'. In modern business conditions, soft technology is generally at least as important a determinant of overall competitiveness as hard technology.

3.2. Hard technology can be further subdivided into *process* technology and *product* technology. This is a simple point, but it has very far-reaching implications. It means that the technology of the product is not determined by that of the process. There has, indeed, been an important evolution here over the past century. In the context of *Fordist* production systems, as developed in the USA at the beginning of the 20th century and widely applied in the Soviet Union, production lines are rigidly dedicated to the production of a particular product, or even model, and are not readily modified to produce anything else. With the development of *flexible production systems* from the 1970s, it has become increasingly possible to separate process and product development. Computerised production lines are easily reprogrammed to produce different models, or even products, and indeed models can be modified on a continuous basis.

3.3. Parallel to this evolution in the pattern of hard technology has been an evolution in the understanding of the process of innovation. In terms of the traditional notion of *science-push,* innovation was seen as something originating from science, then developed by technologists and forged into concrete products by business R&D and marketing departments. Modern thinking has abandoned this crude, linear model in favour of a *matrix* or *integrated* model of the innovation process. In this conception, the innovation process can start at any point in the matrix, and then 'spread out' into the others. The key implication

Figure 1: The innovation matrix

Scientific discovery⇐⇒ ⇑ ¬ ⇓ ¬	Technology development	Product design⇐⇒ ⇑ ¬ ⇓ ¬	Marketing

Marketing	¬ Product design	Technology development	¬ Scientific discovery

is that products, and indeed marketing, cannot be seen as activities that come 'after' everything else. Wherever the process starts, product development and marketing have to be brought in right at the beginning. And if you want to sell, particularly on international markets, you have to make sure that each part of the innovation matrix is as strong as every other part.

3.4. How are the technological realities of Kazakhstan's engineering-based industries and light industry reflected in the mirror of the innovation matrix? Process technology is weak because there has been little investment over a period of more than ten years. But within its (essentially Soviet) parameters, and taking into account that with low wages automation is less important, Kazakhstan process technology in engineering is serviceable, if obsolescent. Much can be done to improve the efficiency of given process technologies through improved work practices and rationalisation of resource utilisation patterns. At the Almaty Belkamit company, for instance, heating costs have been cut by an extraordinary 95% since Soviet times. The general status of process technology in light industry is similar, through here the problem of obsolescence can be a more serious constraint. At the Almaty cotton combine, for instance, penetration of export markets is seriously hampered by the fact that most of the installed equipment cannot produce cloth wide enough to meet international standards; the only solution to the problem is to install new equipment.

3.5. Product technology is generally weaker than production technology in Kazakhstan, not only because there has been no money to develop new products, but also because management still finds it difficult to conceive of an innovation process that actually *starts* with a concept of a new product, and follows this up with market research as well as technical research. Thus at the Intersectoral Scientific and Technical Centre for Engineering (*Mezhotraslevoi Nauchno-Tekhnicheskii Tsentr 'Mashinostroenie' - MNTTs*) in Almaty, projects are essentially conceived in purely technological terms, without any element of organised market research at the initial stage. MNTTs has, for example, devoted substantial resources to the development of new types of agricultural machinery, although the agricultural machinery sector in Kazakhstan is financially the weakest of the engineering-based sectors in the country, and Kazakhstan farms obtain most of their equipment from abroad.

3.6. Soft technology is weakest of all. Few of the companies involved have succeeded in fashioning an organisational system capable of responding to the challenges of the market economy. Many individual managers are not clearly aware of what these challenges are. Failures at the level of soft technology exacerbate weaknesses at the level of product technology. Managers who accept failure to sell on world markets as a fact of life rather than a challenge may have difficulty in envisioning new product development as a tool of market penetration. There are notable exceptions to this pattern, notably the Almaty firm Al'kor. A newly established company essentially spun-off from the Soviet defence industry, Al'kor did not even start production until initial market research work had been done. But

companies like are the exceptions that prove the rule. So when it comes to the task of obtaining international certification of the technological credentials of a Kazakhstan company, it is the soft technology aspects that present the real challenges (see Yuritsyn, 2003, p.27).

3.7. When we look at the overall pattern of technology management in engineering and light industry in Japan, we see that it is still largely based on the linear model of innovation. At MNTTs, for instance, product development is followed by an extended period devoted to testing and certification. Only after that is completed, does marketing of the innovation actually begin. The length of the total innovation cycle is further increased by bureaucratic rigidities, and by the absence of proper testing facilities at or near MNTTs. The result is that MNTTs, founded in 1998, has yet to see any of its innovations brought into serial production. Again, Al'kor provides the exception that proves the rule. At Al'kor, the process of application for certification of new products, for instance, proceeds simultaneously with the actual process of design.

3.8. None of this means that the mass of firms in Kazakhstan engineering and light industry are unviable. Indeed, it is clear that many of them manage to operate at a reasonable rate of profitability – AkhBK, for instance, is marginally profitable, despite the process technology constraints mentioned above. But they do so by concentrating on the lower end of the market - unprocessed cotton, unprocessed cloth (calico and chintz) in light industry, technologically simple goods in engineering. These are sub-sectors where products are essentially homogenous commodities for which the design component is of minor importance. Management in these sub-sectors is a simpler, if not necessarily less testing exercise. *But if Kazakhstan firms in the target sectors are going to meet the challenges of the future, in terms of climbing up the technological ladder, they will have to strengthen all their technological functions, in particular their product technology and soft technology functions.* These ideas are taken up and developed in the case study of the hydrocarbon supply industry, below.

4. The importance of networks

4.1. In order to move up the technological ladder, companies have to *learn.* International experience indicates that, in this learning process, companies are also the best teachers. Thus companies learn from other companies. *Networking,* with buyers, with suppliers, with other companies in the same sector or sub-sector (whether cooperative or competitive), is crucial. 'Suppliers of inputs contribute to generating new ideas and production methods, while competitors are a rich source of new ideas.' (*Innovative Industrial.....,* 2003, p.15)

4.2. The main point of learning with buyers is the transaction. Where that transaction is a strictly commodity one, the learning impact is obviously limited. The further you go up the technological ladder, the more on-going contact there has to be between buyer and seller, the more scope for learning there is. So the development of the human capital base at the company level is a virtuous circle. *The more you know, the more you learn.*

4.3. This experience has been repeated in the transition countries of Central-East Europe (CEE). Notably in Poland, the Czech Republic, Hungary and Slovenia, the building of supply networks in particular has been a crucial element in the reindustrialisation of these countries (Dyker et al., 2003). These networks have been to a degree inherited from the socialist period, but have been transformed during the transition period. In the former Soviet Union, by contrast, inherited elements have tended to dominate supply networks, which has weakened their learning potential.

4.4. Kazakhstan has been seriously disadvantaged by historical circumstances in relation to networking. As a peripheral region of the Soviet Union, its enterprises in the socialist period often formed small links in union-wide production networks (this pattern was particularly strongly delineated in the engineering-based sectors and in light industry). These networks were fundamentally disrupted by the break-up of the Soviet Union. And new, nationally-based networks have not yet developed to take their place. The most striking example of this is the agricultural machinery sub-sector. Previously part of an all-union complex, the agricultural machinery companies of Northern Kazakhstan have signally failed to reorient their networking patterns to the new national dimensions - despite the existence of a strong local buyer base in the form of the wheat-producing industry of Northern Kazakhstan. Another example is steel. Kazakhstan steel firms are not important suppliers to Kazakhstan engineering firms, and Kazakhstan engineering firms are not important customers for Kazakhstan steel firms.

4.5. The scope for networking is further limited by the transaction patterns that have emerged under transition. Many Kazakhstan firms in the two targeted sectors operate strictly on the basis of pre-paid orders (*po zakazam*). Given the financial constraints they face, this is understandable. But it does sharply limit their scope for building up on-going relations with clients which can lead to knowledge-building - as well as profitable business. Industrial associations exist, but they do not seem to operate as effective vehicles of 'horizontal' networking, at least in the engineering sector and light industry. The typical company in the two target sectors of the Kazakhstan economy are effectively isolated to an extent rarely encountered in other countries.

5. The special importance of international networks

5.1. National networks are important, but international networks are more important. Even among the advanced industrial countries, exporting and importing, inward and outward foreign investment, are key vehicles for the transfer of knowledge and technology. For 'catch-up' countries - and that means the great majority of the countries of the world, international networking is even more important. For a country like Kazakhstan, with its peculiar legacy of isolation, it is critically important.

5.2. Once again, the experience of CEE is telling. Since the beginning of transition, the CEECs have dramatically reoriented their trade towards the developed industrial countries, and in particular to the countries of the European Union. They have learned by selling their manufactures on Western markets, and they have learned by importing state-of-the-art goods, especially in the field of information technology. Beyond the sphere of arm's-length trade, they have developed cooperation with firms from the most advanced economies of the world on the basis of

- *Outward processing trade (OPT)*
- *Leasing and franchising*
- *Foreign direct investment*

Let us look briefly at the experience of the CEE transition countries under these three headings:

5.2.1. OPT: Outward-processing agreements played a key role in the globalisation of the CEECs during the 1990s, and have been of particular importance in relation to German business involvement in Poland, for example, where equity ownership raises political problems. Thus German OPT with Poland accounted for over 30 per cent of total EU15 OPT with the CEE-4 (Poland, Hungary, the Czech Republic and Slovakia) in 1996 (Pellegrin, 1999, p.4)

The sectors involved are usually low-technology sectors, where R&D hardly comes into the question. Thus in 1996 textiles and clothing, footwear and furniture together accounted for nearly 75% of total OPT re-imports into the EU (Pellegrin, 1999, p.6). And here lead firms clearly believe that collaborating firms can be trusted to organise their own production lines, so that full internalisation of the operation is not required. That is not to say that outward processing relationships involve no transfer of soft technology from lead firm to collaborating firm. But it does mean that lead firms do not consider it necessary, in the context of relatively simple production technologies, to take control of the determinants of labour productivity. Here, in contrast to the pattern with FDI, lead firms are indeed looking for cheap labour, confident that collaborating firms can keep control of labour productivity - and knowing that if they fail to do so, the financial loss will be theirs, not the lead firm's.

The one ‘middle-tech’ sector which figures significantly in the aggregate statistics for OPT is electrical machinery, which accounted for 13.6 per cent of total OPT re-imports into the EU in 1996 (Pellegrin, 1999, p.6). And here case material demonstrates the possibility of OPT-based trajectories which may take firms a long-way beyond the basic OPT model, opening up much wider vistas of learning and technology transfer.

> The case of Vilati (Budapest) is illuminating in this respect. Vilati is a small company producing control systems, printed circuit boards and other electrical and electronic components. Although it has several OPT partners, Vilati has a privileged relation with Brunswick Bowling (US). It is integrated into the production chain of its main OPT partner in a rather flexible way, but it does not purport to recover independence, nor does it count on integrating its partner’s production chain and upgrad[ing] its position within it. In fact, if Vilati is more loosely associated to its foreign partners than if it were full integrated, this is not to say that its relations are more fragile, or unstable. Its strategy is indeed to establish its reputation as reliable and technologically updated supplier of component system[s] to Original Equipment Manufacturers [OEM]. In this case OPT is used as a vehicle for implementing

> methods of production in line with the new requirements of international competition in terms of flexibility and quality. OPT goes together with the automisation and the decomposition of the production process into stages which are more independent and 'de-integrated' from one another. (Pellegrin, 1999, p.16)

5.2.2. Leasing and franchising: franchise and licensing agreements have been of considerable importance for the CEECs, notably in the software industry and in other specialist supplier sectors. Licensing agreements involve hard technology transfer by definition; in practice franchising is not very different, though there may be more stress on transfer of soft technology in this case. Franchise and licensing agreements have had a notable impact in terms of integrating small CEE firms into global networks in technologically highly dynamic sectors, and allowing them to develop their technological capabilities through the scope for two-way technology transfer which these networks offer. Leasing has had a major impact within the CEECs, in terms of opening up otherwise inaccessible investment opportunities, especially for small firms, and accelerating the rate of technology transfer.

5.2.3. Foreign direct investment: FDI has been a key vehicle of technology diffusion world-wide, and the transition region has been no exception in this regard. Once again, the transfer of soft technology has been of particular importance, against the background of the marked weakness of the communist system in the area of management and organisational science and technology. Major investments by Western multinationals have made crucial contributions to the creation of a modern business technology in the former communist countries, and this is as true of investments by MacDonalds and Coca-Cola as of investments by Ford, Volkswagen, Siemens and Suzuki. But investments in key industrial sectors like the motor-car industry have been equally important in terms of the transfer of hard technology (state-of-the-art production lines and new models) and the building of supply networks, and have done much to reinforce the underlying technological congruence of the former communist economies.

That said, it must be admitted that FDI has not maximised its potential for technology diffusion in the transition region. Explicit restrictiveness in related technology transfer has been the exception to the rule, and there have been cases where foreign investors have gone out of their way to help associated companies in transition countries to access more advanced technologies (Havas, 1996). But foreign direct investors in Eastern Europe have generally invested little in R&D facilities as such (Inzelt, 1999; Urem, 1999). Thus they have failed to make up for the deficit in social capability found in domestic R&D systems, and have accordingly left the transition countries still suffering from a key constraint on the scope for effective technology diffusion.

Box 1: Foreign direct investment in Eastern Europe: four key actors who are all present in Kazakhstan too

Volkswagen (Germany)	Volkswagen were one of the main early movers in CEE, taking a 31% stake and management control in the old-established Czech Škoda works in 1991. As part of the deal, VW promised to build a new engine plant. In the event, the recession of the early 1990s and the losses incurred by VW in 1992-93 prompted a drastic revision of the plan. In 1994 VW agreed with the Czech government that it would raise its stake in Škoda to 70%. The plan to build a new engine plant was dropped, but VW confirmed its commitment to build a new car assembly line and introduce new models. The initial investment in the project over the period 1991-2000 came to nearly DM4 bn. VW's strategy for Škoda has been marked by a very positive approach to the existing human capital stock at the Czech company. **'**What was lacking was a business function.... But we took on the rest of the workforce one-for-one. From the point of view of qualifications, they were of the same standard as you meet in Western firms. Their education and their technical skills were on a par with ours.' Training and re-training is an important part of the company's strategy, but the stress is very much on retraining on the job, and executives have expressed a good deal of scepticism about the value of more 'academic' retraining. 'We had 10,000 men to find work for. They had to make cars, cars that would sell. That's what you have to aim for – always better products, new markets, that is the thing. I tell you, you cannot send 10,000 men back to school. That is simply not possible. And anyway, they would not learn what they need to learn there – assimilating new functions, learning about markets etc....' VW have also been very proactive in terms of building local supply networks, integrating Škoda's existing suppliers into their supply network and helping them to raise their game. It should be noted, however, that VW's main strategy for upgrading the competitiveness of local suppliers has been to help them to find Western partners with whom they could establish joint ventures. It is the policy of VW, as it is of many international companies investing in E.Europe, to work with a very limited number of first-tier suppliers. These are the companies which effectively manage the supply network on behalf of the lead company, and these first-tier suppliers are in the main themselves foreign companies or joint ventures, even if they are located in the host country.
Siemens (Germany)	Siemens has been active in the region since communist times. It was doing business in the former Soviet Union before WWII, and reopened an office in Moscow as early as 1971. It is a classic example of a global firm, following a global strategy. And that means that strategy for the transition countries has to fit in to that global strategy. **'**The basic point is that Siemens is a world firm. If you look at how many countries we are active in, then we must be one of the top global players. And on the competitiveness side, we

	recognise that this world-wide network is a real advantage, to be at the coal face in every region. If we think of Eastern Europe in this connection, when the Iron Curtain came down, then it was clear from the point of view of the firm's philosophy the direction we had to take. We had to get in there. The markets were open, we had to engage with a similar or identical concept to the one which had been used in the rest of the world, and had proved successful.' Siemens operates mainly in the areas of power technology, tele-communications, automated systems and medical technical services. It follows a generally open policy in terms of technology transfer to subsidiaries or partners in transition countries, and pursues an active retraining policy which targets the deficiencies in the knowledge base of local workers, particularly with regard to practical know-how and market-oriented skills, but at the same time recognises their strength, e.g. in terms of theoretical knowledge. Siemens' approach to retraining is more academic than in the case of Volkswagen. They have a special unit in Ürdingen, in Germany, which specialises in the training of staff from new locations and host countries. But there is also a strong emphasis on on-the-job training. 'People from (the subsidiary in E.Europe) come and spend a period of time at the lead factory. And they don't just come to follow courses, - they actually work in the factory as well. That includes assembly-line work, so that it includes blue-collar workers as well, right up to the management level – of course with a different orientation.' In relation to the development of local supply networks, Siemens' experience has been more mixed. 'In some areas of supply, we simply cannot get the components to the quality and technical specifications that we require. So we have to bring these products largely from Western Europe. But not because we want to. We would like to get more involved in the local supply market...' Siemens tries to solve this problem by developing the teaching role of its buying departments. 'The subsidiary has its own buying department – relatively strong, with 25 people. The process always starts with the identification of suppliers, which are in general terms relevant for us, and which have the technological level we need for our products. So we have here in the buying department clear benchmarks on supplier qualifications, and we will continue to do this. We train people specially in this business of assessing suppliers....' Despite these efforts, it is clear that Siemens continues to experience significant difficulties in its attempts to integrate local suppliers into its FDI undertakings in the transition countries.
Danfoss (Denmark)	Danfoss is a major supplier of hydraulic equipment to CEE. It has sales companies in all the countries of Eastern Europe, and has established production units in Poland, Russia, Ukraine, Bulgaria and China. Some of its plants in Eastern Europe are technologically virtually identical to the main plant in Denmark (e.g. the plant in Poland), while others are essentially assembly plants (e.g. the one in Bulgaria). Company strategy for the transition region is seen very much as an element in global strategy. 'If you are not world-class to

	begin with, you will not become world-class in Eastern Europe.' Cost considerations have been a key factor in investment decisions, but the desire to be near key customers, or to establish production capacity within an existing 'cluster' has also been important. Investments in the region have been primarily greenfield. 'You can do it [take over a local company], but at some point you have to substitute their brand with your own, and that is neither an easy nor a cost-free process. If you start producing something of lower quality in Eastern Europe and then re-export it to Western Europe, you run the risk of spoiling your brand-name in Western Europe. This risk is smaller in, for instance, China, because of the geographical distance....' Danfoss has established R&D facilities at its transition region plants, notably in Poland, but also in Russia and China. It follows a policy of modifying its in-house technology to suit local conditions, and existing local infrastructure. 'One example is district heating [in Russia]. It is not realistic to dig up all the pipes in the road, in order to install new components. We are forced to take the existing infrastructure as a point of departure, and try to support it.' They have local training programmes including on-the-job training, but they also bring people to Denmark for training, *including key customers, e.g. the electricians who will install their components and systems.* In addition, they have training programmes for local wholesalers. The general trend in the company is to spend more and more money on training. They use local suppliers in Eastern Europe, mainly for commodity supplies, but subject them to strict quality controls. They have followed a policy of reducing the number of first-tier suppliers. They do not seek to impose Danish culture on their local work-forces in the transition countries (e.g. in relation to individual responsibility, flexible working patterns etc.)
Grundfos (Denmark)	Grundfos is a major international producer of pumps. It has production capacity in Hungary and Russia. In Hungary, where its subsidiary makes motors, the motivation for the investment was largely lower costs. In Russia, by contrast, the attraction is primarily the huge potential market for pumps, thermostats etc. Again, the regional strategy is very much nested within a global strategy. 'Markets that are important for Grundfos have to be supported by own production by Grundfos.' Grundfos's supply chain is 'long and deep', but Grundfos only cooperates technologically with first-tier suppliers. Subsidiaries in transition countries are subject to strict quality controls, but this is seen as a transitional phenomenon. Grundfos has just opened up an 'academy' for sales representatives, located in Denmark. Employees of the firm come from all over the world to train at this academy. Grundfos also trains workers locally in Hungary and Russia, and uses the facilities of local technical schools. They are happy to contribute to human capital formation in these countries, but think that the governments of the countries concerned should pay a share of the costs thus incurred. Grundfos's strategy on human capital formation is very clear. 'We exist in order

	to sell pumps and we know that we are no better than the people we employ. You have to ensure the right level of competences. This is one of the reasons why we didn't locate in South-East Hungary [a less developed part of Hungary]. Some did, and they received tax holidays, paid a very low price for land, and the hourly wage was lower. They were so greedy – sorry. In our opinion this is not a good idea. The marginal benefit you get from all this is easily offset by lower productivity or, even worse, unreliable deliveries.' Like Danfoss, Grundfos do not attempt to impose their own culture on subsidiary companies. 'We have to recognise that cultures are different. We cannot change the culture of the whole world to our culture. Even so, our fundamental values can still prevail... In terms of slogans, if you want to *globalise*, you must also *localise* – especially in management, but also on the production side to some extent. Therefore, we aim at hiring local managers – preferably from the region where we locate – precisely to include the cultural aspect.'

Note: All quotes are from interviews conducted directly with executives from the firms concerned by the author and his research team.

6. International networks in Kazakhstan

6.1. For Kazakhstan, the pattern of exporting has largely excluded significant learning effects from *arm's-length trade*. Notably in the engineering-based sectors and light industry, exporting has very much followed the domestic pattern – it has been in response to specific orders, probably partly or wholly pre-paid. In 2001, Kazakhstan exported machine-tools to a value of $212,700 to Iran. In no other recent year have exports of machine-tools to that country exceeded $100,000, and over the first six months of 2003 they were negligible. In 2001 Kazakhstan exported $150,000 worth of trailers to Kuwait. For every other recent year the corresponding figure is zero. The pattern is absolutely identical for the United Arab Emirates. Lithuania imported cotton yarn to a value of $679,900 from Kazakhstan in the first six months of 2003 and none in any other recent year. Estonia imported $330,500 worth of cotton cloth from Kazakhstan in 2002, and virtually none in any other recent year. It is obvious that the Kazakhstan firms involved can learn very little from one-off deals like these. There is somewhat more continuity on the import side, but here too, there is a tendency for patterns to be erratic. Thus Kazakhstan imported $705, 800 worth of tractors from Italy in 2000 and $946,000 in 2001, but virtually none in 2002 and 2003. Imports of heavy earth-moving equipment from Slovakia came to $1.908 m in 2000, but have been negligible since. These patterns may make some sense in terms of obtaining value for money, but, again, they tend to limit the scope for significant learning effects.

6.2. It might be expected that there would be some *OPT* in the Kazakhstan textile industry, with some variation in the model to take account of the fact that Kazakhstan produces a certain amount of raw cotton. In practice, there is very little evidence of OPT-type relations in the foreign trade figures. But one or two Kazakhstan firms do have OPT relations with American firms. The most notable example is the Diana textile company from Ural'sk (NB located in the North-West of the country, a long

way away from local cotton supplies, and indeed from Central Asian cotton supplies). Diana has an OPT arrangement with the American company LL & S Purchasing Corporation. It exports 70% of its output, mainly in the form of coats and jackets and school uniforms. It also makes special clothing, mainly for the domestic market (for the oil industry?). It still gets most of its equipment from the countries of the former Soviet Union. Other major textile producers, notably the Almaty Cotton Combine (AkhBK), have explicitly rejected OPT as a system of relations with foreign companies, on the grounds that it is unprofitable for them.

6.3. There is no evidence of OPT-type relations as such in any other sector of the Kazakhstan economy, apart from a substantial amount of tolling of non-ferrous metals, to an average annual value of some $600 m. Tolling of non-ferrous metals is, indeed, the second-highest element in Kazakhstan's exports, after oil and gas (*Trade Policy Overview...,* p.4)

6.4. Lack of systematic data makes it difficult to assess the scale and pattern of development of *leasing and franchising* in Kazakhstan. It is estimated, however, that the total annual volume of leasing in the country is around $250 m (Dzholdasbekov, no date, p.3). A number of laws have been passed with a view to facilitating the development of leasing ('On financial leasing', 'On the introduction of changes and additional elements into some of the legislative acts of the Republic of Kazakhstan on questions of leasing') and franchising ('On complex business licenses (franchising)'). But Kazakhstan has not ratified the Ottawa Convention on Financial Leasing. Leasing is most highly developed in Kazakhstan in agriculture, where farms are heavily dependent on leasing of equipment, on very favourable terms, from the Ministry of Agriculture, and in relation to transport equipment – aircraft, lorries and cars. While the value of foreign involvement in leasing is generally recognised, there seems to be little of it at present.

6.5. A *Kazakhstan Franchise Association* was created on 6 February 2002, with its seat at Almaty. It collaborates with the International Franchising Association (WFC), and includes among its goals 'the setting up and maintenance of relations with foreign franchising associations and franchising companies outside Kazakhstan'[2]. This initiative has yet to bear fruit in terms of operational development of franchising in Kazakhstan.

6.6. *Foreign direct investment* in Kazakhstan is mediated by 5,300 foreign-owned companies and joint ventures.[3] It generates $8.5 bn of turnover each year and employs some 315,000 people, around 4.3% of the active population of the country. Annual inflow of FDI into Kazakhstan industry has been around $3 bn in recent years, coming to $2.95 bn in 2002. These figures compare favourably with corresponding figures for CEE. The annual trade surplus from FDI is some $1.5 bn. But while FDI in Kazakhstan is heavily oriented to exporting, it also serves the home market, with domestic sales from companies hosting foreign investment standing at over $6 bn annually (*Kratkii...*, 2003, p.136). FDI in Kazakhstan is heavily concentrated in the oil and gas sectors, with 71% of inflow into industry in 2002 going to those sectors, and some 35% of turnover from FDI originating from Atyrau

[2] *About Kazakhstan Franchise Association*, kfa@ok.kz
[3] Figure for 2002. This represented a 33% increase on 2001. See *Kratkii...* (2003), p.135

oblast', the main oil-producing area. In global terms, these are not the sectors with the highest potential for generating learning effects, because they do not tend to spawn highly ramified supply networks, and because they sell globally. But they do need a supply base, and many of their supplies, especially in relation to drilling, have to be to the highest specifications. At present, the bulk of these supplies is imported.[4] But domestic firms (including foreign-owned domestic firms) do provide a non-negligible proportion of supplies to the hydrocarbon industries. In the longer term, as noted in the *Innovative Industrial Development Strategy* (pp.19-21), the production and investment potential of the fuel and energy complex can be used as a launch-pad for industrial modernisation. This raises a number of key analytical/developmental issues, which are taken up in a later section.

6.7. Outside the oil and gas industries and allied sectors, where Chevron, British Gas, Agip and Mobil are the biggest foreign investors, FDI has been at a comparatively low level. There are one or two significant islands of FDI in manufacturing. Lucky Goldstar (LG) of Korea is responsible for giving Kazakhstan revealed comparative advantage in the manufacture of TVs and PCs. But this operation is purely assembly, with all components being brought in from Korea. The coefficient of value added in Kazakhstan is only about 5%. Daewoo of Korea assembles motor cars in Kazakhstan Daewoo is also currently building a $20 m fibre-optics factory in Kazakhstan. Siemens manufactures computers, computer parts and general electrical supplies in Kazakhstan, but has been reluctant, up to now, to embark on large-scale investments. The Karaganda Steel Works is owned by the international steel firm ISPAT, and trades under the name ISPAT-KAZMET. But the works is largely oriented to the export market for rolled steel, and supplies little to domestic steel-users. Reorientation of the plant to the supply of special steels to the domestic market (mainly to engineering companies) would require major restructuring, and would likely involve a critical loss of economies of scale.[5] ISPAT-KAZMET also tends to obtain its own supplies from abroad. Samsung has a 27% share the Kazakhmys copper and silver mining concern, based in Dzheskazgan. These projects have been of considerable importance in themselves. The development of Kazakhmys, in particular, has demonstrated how the introduction of leading-edge soft technology can revolutionise a traditional, primary-producing sector. But none of the plants involved have a big networking effect on the Kazakhstan economy as a whole, none have done much to raise the game of other Kazakhstan companies (See *Innovative Industrial..., 2003, p.18*). We should note the LG does have strategic plans to raise the domestic proportion of value added in its Kazakhstan operations, and that it is being supported by the Kazakhstan Investment Committee in this, in the form of specific forms of tax relief in relation to the production of washing machines and vacuum cleaners. Overall, however, the conclusion must be that, while the impact of FDI in Kazakhstan outside the host firm itself has not been non-negligible, it has been much less than experience in other transition countries suggests is possible. Indeed, foreign-owned companies in Kazakhstan seem to share the same characteristic of *isolation* which we picked out as a key feature of domestic firms.

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[4] At present Kazakhstan imports annually some $2 bn worth of equipment every year, this accounting for some 30% of total imports. It can be assumed that the bulk of these imports goes to the oil and gas industries.

[5] Note that ISPAT does have plans to build a plant near Aktau, on the Caspian Sea, to manufacture large-diameter pipes for the oil and gas industry. See Tazhutov, 2003.

7. Engineering and light industry in Kazakhstan - some basic data

7.1. The textile industry:

The textile industry of Kazakhstan has gone through a process of sharp retrenchment over the past decade. After the break-up of the Soviet Union, output fell sharply, and employment with it. The sector reached its lowest point in terms of output in the late 1990s. At the Almaty Cotton Combine, for example, annual output at that time was only 3% what it had been before the break-up of the USSR. Since the late 1990s there has been a limited recovery in terms of output, with total production growing by 260% 1998-2002. But the downward trend in employment has continued, with the total workforce of the industry falling by some 43% between 1998 and 2002. As a result of

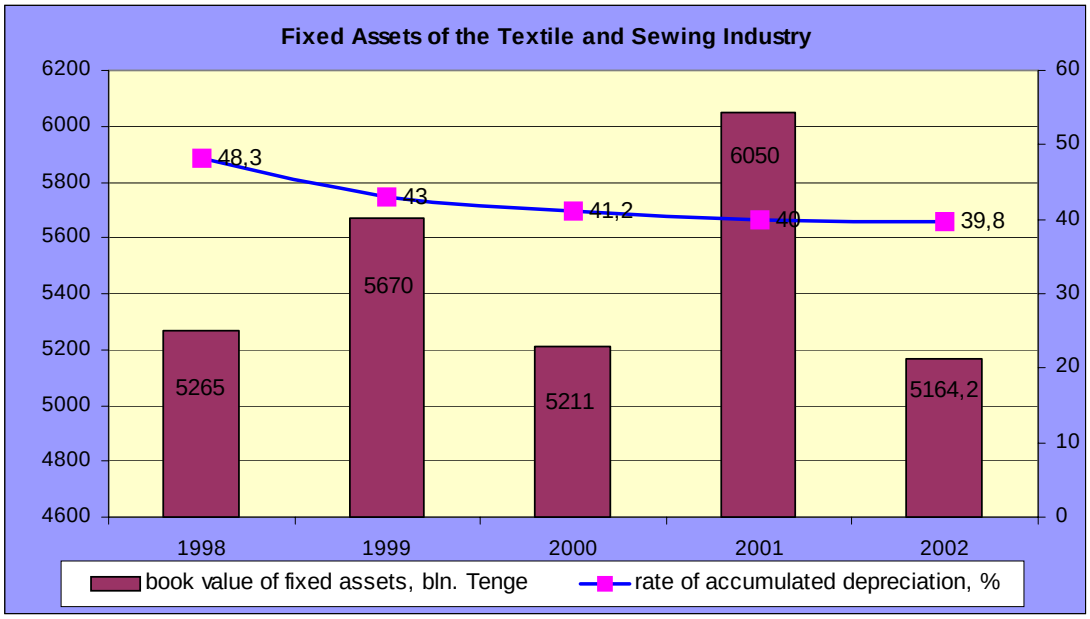
Table 1: Key financial indicators for the textile industry

	1998	1999	2000	2001	2002
Total profit (m tenge)		229	-61	-1006	-759.6
Rate of profit	-16.1	-13.1	0.1	-0.4	
Proportion of companies making losses					51.5
Fixed investment (m tenge)		900	300	1,500	
Share in total increment to gross industrial output (%)		1.8	2.8	2.1	1.2
Share in total increment to industrial value added (%)		5,8	1.4	2.9	

Source: National statistics

low levels of investment over a long period (see Table 1), the capital stock of the sector is generally obsolescent, with 39.8% of capital stock fully depreciated in 2002 (see Figure 2). The annual rate of renewal of capital stock is just 7.4%. There was a modest recovery in investment in 2001, but this did not make a significant difference to

Figure 2



Source: National statistics

the overall capital stock situation. The main export of the industry is raw cotton, and ready-to-wear clothes accounted for just 3.3% of total textile exports in 2002, 10.8% less than in 1998. As Table 1 shows, the industry operates at the very margin of profitability. Half of Kazakhstan's textile companies operate at a loss, and even the best companies report only low levels of profitability. This, in turn, tends to exacerbate the problem of low investment.

7.2. The leather and footwear industry:

7.2.1. On 1 February 2003 there were 137 firms registered in this sector, of which 130 were small, six were medium-sized and one was large. Only one firm (a small one) is in state ownership. Fourteen small leather and footwear companies are foreign-owned as is one medium-sized leather and footwear company. All other companies are held by

Table 2: Key financial indicators for the leather and footwear industry

	1998	1999	2000	2001	2002
Total profit (m tenge)	-96	-37	-68	29	-50.2
Rate of profit	-23	-10.3	-20	4.4	-3.2
Proportion of companies making losses					
Fixed investment (m tenge)		46	29	200	
Share in gross industrial output (%)	0.1	0.0	0.1	0.1	0.1

Source: National statistics

private, domestic capital. Output of the sub-sector has nearly tripled since 1998, and grew by 36.8% in 2002 by comparison with 2001. Still, leather and footwear accounts for only 0.1% of total industrial production. Employment in the sub-sector fell by 38% between 2001 and 2002, so that labour productivity grew by over 220% over that period.

7.2.2. As Table 2 shows, the financial position of the leather and footwear industry is weak. Over recent years, average profitability has been barely positive (it was 1.4% over the first nine months of 2003). On the other hand, it has improved markedly since 1998. Behind these financial trends stand trends in investment. There was virtually no investment in the sub-sector in the period 1998-2000. Then investment shot up in 2002, on account of a single foreign investment – the sale of the Petropavlovsk leather factory to the British East Hides Group. The reconstructed factory started production of semi-processed leather goods in December 2000, under the name Siriopet. Even so, the book value of the fixed assets of the sub-sector fell by nearly 40% in 2002, by comparison with 2001. And the fully depreciated proportion of the total fixed capital stock stood at 28.5% in 2002.

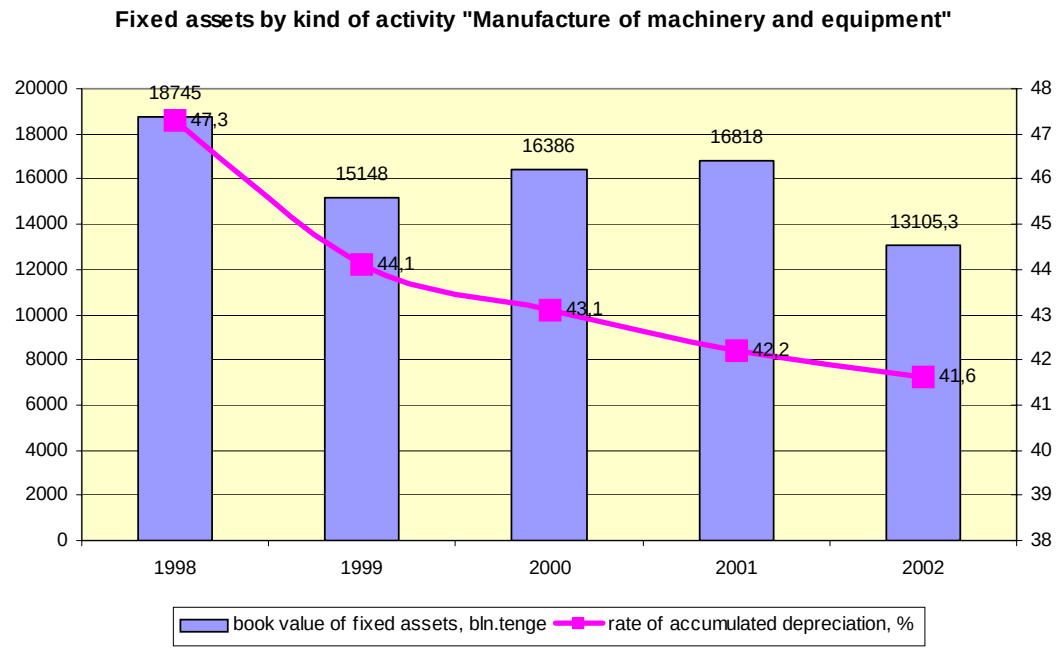
7.2.3. Kazakhstan exports some 1.5 m pairs of shoes per year. But the great bulk of these are re-exports, so that the gross export figures tell us nothing about the level of competitiveness of the sub-sector.

7.3. The engineering-based industries:

7.3.1. In 2002 there were 1,046 'machine-building' firms in Kazakhstan (45.3% fewer than in 1998), including 919 small, 93 medium-sized and 34 large. Of the total number of firms in 2002, eight were government-owned and 21 foreign-owned. All the rest were privately owned (some with a minority, non-controlling state shareholding). Employment has tended to fall in the engineering-based industries, but not as sharply as in textiles and leather and footwear, totalling 74,900 in 2002 compared to 90,300 in 1998. After falling sharply in the early and mid-1990s, the aggregate output of these industries recovered strongly in the period 1998-2001, before falling by 2% in 2002. The share of the engineering-based industries, taken together, in total industrial production fell from 3.4% in 2001 to 2.9% in 2002.

7.3.2. As Tables 3-5 indicate, the overall financial position of the engineering-based sectors is not too bad. Since 1999 the average rate of profit in the electrical electronic and automotive sectors has gone up from around zero or less to 8-9%. But nearly a third of firms in these sectors make losses, and most of the companies involved are at best marginally competitive. And in the machinery and equipment sector, profitability is currently around zero (a big improvement since 1998), and nearly half of the firms in

Figure 3:



Source: National statistics

the sector make losses. One of the key factors lying behind this pattern is lack of investment. As Figure 3 shows, the capital stock of the 'manufacture of machinery and equipment' sub-sector was 30% lower in 2002 than it had been in 1998. Over the

Table 3: Key financial indicators for the machinery and equipment industry

	1998	1999	2000	2001	2002
Total profit (m tenge)	-5275	-1073	-326	472	-477
Rate of profit	-27.7		-1.6	1.9	-2
Proportion of companies making losses					44
Fixed investment (m tenge)		265	82	66	
Share in total increment to industrial value added (%)		1.7	0.6	11.7	

Source: National statistics

Table 4: Key financial indicators for the electrical and electronic goods industry

	1998	1999	2000	2001	2002
Total profit (m tenge)	0	-431	292	359	721,64
Rate of profit		-4,9	1,8	1,7	7,4
Proportion of companies making losses					34.5
Fixed investment (m tenge)		42	45	348	
Share in total increment to industrial value added (%)		0.3	0.5	1.3	

Source: National Statistics

same period, the fully written-off proportion of the total capital stock fell significantly, but still stood at more than 40% in 2002. In the automotive industry, the pattern is a little different. Substantial increases in both domestic and foreign investment in the period 1999-2000 have meant that the total capital stock of the sub-sector was some

Table 5: Key financial indicators for the transportation equipment industry

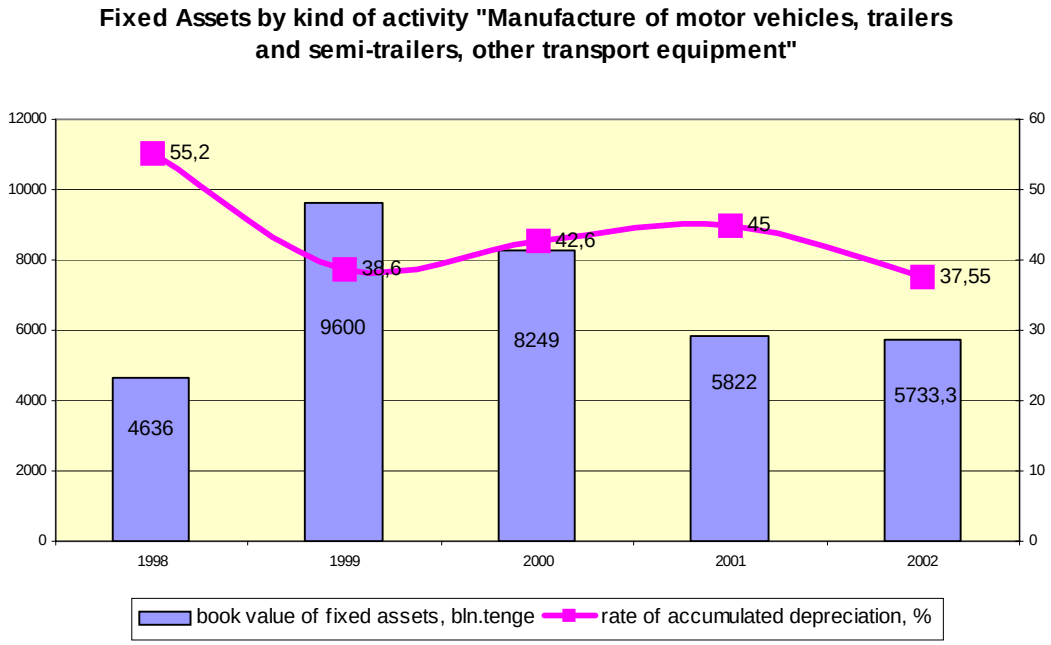
	1998	1999	2000	2001	2002
Total profit (m tenge)	13	156	644	1985	2061,2
Rate of profit		2,7	4,8	8,8	9,9
Proportion of companies making losses					23,9
Fixed investment (m tenge)		138	6	23	
Share in total increment to industrial value added (%)		1	0.9	7.5	

Source: National statistics

24% higher in 2002 than it had been in 1998, while the proportion of fully written-off equipment within the capital stock fell from 55.2% in 1998 to 37.6% in 2002 (Figure 4). But the trend in the total capital stock of the sub-sector has been clearly

downwards since 1999, and it is evident that the sub-sector needs another major investment boost, if the positive elements in capital stock trends are to be maintained and strengthened.

Figure 4:



Source: National statistics

8. The pattern of innovation in the engineering-based industries of Kazakhstan

8.1. The study carried out by the Centre for Science Research and Statistics (CSRS) of innovation activity in Kazakhstan industry presents a striking picture of the pattern of innovation (*Analiticheskaya Spravka,* 2002). On the basis of a questionnaire completed by twenty-one engineering firms, CSRS found that engineering accounted for 65% of the total number of improvements in process technology in 2002 (155 out of 238); and the number of improvements in process technology in engineering grew by 28.1% between 2001 and 2002. Of a total number of new technological processes introduced in 2002 of 278, 167 (60%) came from engineering. And in that year firms from the engineering and electronic industries claimed that 35.6% and 21.2% respectively of total output was of innovatory products. Yet while engineering output increased by 8% 2001-2002, sales fell by 5%. These figures suggest a pattern of essentially improvisatory innovation. In the face of increasing competition from foreign producers, and in a situation where sales are carried on essentially on the basis of pre-paid orders, firms make small, superficial innovations, to address the special needs of particular customers, or simply to produce the appearance of innovation. These superficial innovations at the product level have no direct link with process innovation. This is a pattern which is common, and well-documented, in the transition countries of Central-East Europe. Inzelt has dubbed it 'skin-deep' innovation (Inzelt, 1999). Strikingly, total expenditure on R&D in engineering in Kazakhstan in 2002 was just 600,000 tenge ($4,000).

8.2. The other feature of the pattern of innovation in the engineering-based industries

brought out by the CSRS study is *autarky.* Out of the modest number of new technologies introduced, none came from abroad. Expenditure on intellectual capital - patents, licenses etc - is negligible. In this respect, the data on innovation strikingly confirms the general picture of the engineering-based industries in Kazakhstan - as a collection of firms with few links between themselves, and virtually none with the wider world of engineering.

8.3. In light industry, there were just 13 improvements in technological processes in 2002 (compared to 7 in 2001). A total of six new technological processes were introduced, of which two were foreign. Expenditures on R&D in light industry were negligible, and only eight new products were introduced (again, a slight improvement on the 2001 figure of 3). And just 11% of final output of the sector in 2002 was accounted for by innovatory products. Operating, as it does, with fairly simple basic process technologies, but forced to meet the demands of mass consumption and changing fashion, the textile sector is one where we would expect the innovation process to be driven by product innovation. This clearly does not happen. The explanation should probably be sought in the rigid Fordist production lines characteristic of textile plants, as discussed above. Inability to meet international standards traps Kazakhstan textile producers in the lowest categories of commodity production, making it impossible for them to develop an innovatory dimension at the level of product technology.

9. The oil and gas supply industry

9.1. As discussed above, the hydrocarbons supply industry can operate as a key channel for indirect exports, and a key field of competitiveness for domestic engineering companies, especially in combination with the construction and construction materials sectors. In order to obtain a clearer analytical picture of the pattern of supplies to the oil and gas industry, we have taken data for the import substitution programme and classified it by level of technological complexity (see Table 6). We use a simple, three-category classification, viz.-

commodity goods: these are simple artefacts, made to standard specifications; quality is also fairly standardised, and price is the key variable in contracts;

complex components: here the specifications are more complex, more varied, and factors such as quality and reliability may be as important as price in contracts.

specialist supplier goods: these are goods involving a high level of project organisation and a significant element of design; that in turn involves close cooperation between client and supplier; specialist supplier goods are usually, but not always, 'high-tech' goods (Pavitt, 1984).

9.2. Analysis of the data on this basis generated the following conclusions:

1. The biggest concentrations of supply transactions (especially when value of contracts is taken into account) are in column 4 - complex components. This demonstrates an important basic truth - that Kazakhstan engineering firms are capable of manufacturing technologically sophisticated components to the

standards of international oil and gas companies (I have not distinguished between foreign-owned and domestically-owned oil and gas firms here. I assume that since they all face the same global competitive conditions, they will impose broadly similar standards on their suppliers.) These firms have thus proved their *competitiveness* on a level playing field – one of the key principles of the *Innovative Industrial Development Strategy* (p.14)

2. This does not mean that *all* or even *most* Kazakhstan engineering firms are capable of doing this. The group of firms that supplies the hydrocarbon industry is self-selecting, and probably represents the best in Kazakhstan engineering. The majority of Kazakhstan engineering firms are probably not capable of performing to this standard. In terms of the potential for *learning processes* among Kazakhstan firms, however, it is that best companies that matter.

Key question: how will this experience be universalised through the rest of the industry?

3. There are very few transactions in the fifth column, that for specialist supplier goods. This suggests that, while the best Kazakhstan firms are capable of making highly sophisticated *artefacts,* they are generally not capable of producing complex *systems* of artefacts involving a high element of design and interconnectedness of components. This is not a surprising conclusion. We find exactly the same thing in the Russian oil and gas industry, for example. It is nevertheless striking that a leading Kazakhstan engineering form like Al'kor, which at interview comes through clearly as a specialist supplier firm offering an integrated package of product, design and organisation, does not appear in column 5 at any point in the table.

4. None of this implies that the present pattern of supply is undesirable. If Kazakhstan firms can make a profit by supplying complex components, or even commodity goods, they should continue to do so. Indeed supplying commodity goods like cables, tanks and nuts and bolts is clearly extremely important in aggregate value terms at the present time.

5. On the longer term view, however, the situation looks rather different. As argued earlier, the factors which make for Kazakhstan competitiveness in the production of commodity goods and complex components will inevitably change as time passes. Like other countries, Kazakhstan will be forced to climb the technological ladder. That means that Kazakhstan will have to develop the capability to produce specialist supplier goods to international standards, *if it is to develop dynamic competitiveness in engineering industries.*

6. That does not mean that Kazakhstan engineering has to move towards specialisation in 'high-tech' sub-sectors. It is striking, for example that the most important complex goods that Kazakhstan engineering firms supply to oil and gas companies are caravans and mobile homes. On the Italian model, this specialisation could be developed into something more sophisticated, with a bigger design element, which would be specialist supplier, but still 'middle-tech'.

7. Supplier firms with elements of foreign ownership (NB these have been identified on the basis of their names; this is a very crude methodology, and needs to be refined) are not particularly prominent in the oil and gas supply industry. And outside the radio and telecoms sectors, they are not generally present as specialist suppliers (NB I have classified IT equipment as complex components rather than specialist supplier goods. Reclassification of these goods to the top category would strengthen the presence of firms with an element of foreign ownership within the specialist supplier category.) Clearly, therefore, the Caspian hydrocarbon supply industry is not dominated by foreign-owned firms in the way that supply industries e.g. in Central-East Europe, are.

Key question: would it be better to have more foreign-owned suppliers?

Table 6: Patterns of supply in import substitution

Buyer firm	Supplier firm	Commodity goods	Complex goods, components (komplekt-uyushchie)	Specialist supplier go
KharikeinKumol'Munai, Tengizshevroil, Aktyube-munaigaz, Adzhip KKO, Petro Kazakhstan Kumkol Resources, Karazhanbasmunai, Kazturkmunai	ZAO Aziya elektrik, Kazenergokabel', Kaztsentrelektro-provod, TST Telekom, TSM-Tomiris, Kazakhkabel', Kazelektromash, ALSI, **Korpor-atsiya OTS**, KSM, Mangistau-KIP-Servis, Dinar elektromash	**CABLES**		
KharikeinKumol'Munai, Karachaganakskaya Integrirovannaya Organizatsiya, Kazturkmunai, Tengizshevroil, Aktyubemunaigaz, Petro Kazakhstan Kumkol Resources, Karazhanbasmunai	RMZ, VF Poisk, Kaspiimunaimash, AZTM, Atyrauneftemash, Tselingidromash, Georgievskii RMZ, Metallist, Turkestan nasos, Tselingidromash, Kelet, Aktyubinskii zavod neftyanogo oborudovaniya, AKTALMA, Khazar Oil		**PUMPS**	

KharikeinKumol'Munai, Karachaganakskaya Integrirovannaya Organizatsiya, Tengizshevroil, Petro Kazakhstan Kumkol Resources	Atyrauneftemash, YuKMZ			***PUMPING STATIONS***
KharikeinKumol'Munai,Petro Kazakhstan Kumkol Resources	**Asyn Procure-ment**, Kashkormash-zavod		**Electric furnaces**	
KharikeinKumol'Munai, Kazturkmunai, Aktobemunai-gaz	Aktyubinskii zavod neftyanogo oborudovaniya	**Pump rods** (shtangy)		
KharikeinKumol'Munai, Kazgermunai, Kazturkmunai, Tengizshevroil, Petro Kazakhstan Kumkol Resources	Atyrauneftemash, Kuat, Kazelektro-montazh, SP Belkamit, Aktybemunai-finans, **Shevron Munaigaz Ink., Asyn MTS**, Romul Invest		**PIPES**	
KharikeinKumol'Munai	Neftemash-komplekt		Latches	

KharikeinKumol'Munai, Tengizshevroil, Aktyubemunaigaz, Petro Kazakhstan Kumkol Resources, Karazhanbasmunai	Neftemash-komplekt, Atyrauneftemash, Alver Kholding, ZIKSTO, Inkom-Oil, Romul Invest, Khazar Oil	**FLANGES**		
KharikeinKumol'Munai, Karazhanbasmunai	Neftemashkomplekt, Korando-Plyus, Mangistau-KIP-Servis		**VALVES**	
KharikeinKumol'Munai, Kazgermunai, Tengizshevroil, Aktyubemunaigaz, Adzhip KKO, Petro Kazakhstan Kumkol Resources, Karazhanbasmunai	Zavod stroikonstruktsii, Shapagat, SP Belkamit, Teploenergo-oborudovanie, Leka, Kazkhimmontazh, Aktyubinskii zavod metallokonstruktsii, ZISTKO, Promtekhnoservis	**TANKS**		
KharikeinKumol'Munai	**Services Inter**, Aksai		Polishing machine	
KharikeinKumol'Munai, Petro Kazakhstan Kumkol Resources, Karazhanbasmunai	**Services Inter**, Aksai, Burvodstroi, Burkit Internashnl		**Drills, boring equipment**	
KharikeinKumol'Munai	Omega		Electric plates/shields	

KharikeinKumol'Munai	Ontustik Kazelektro-**montazh**	Racks for pipelines		
KharikeinKumol'Munai	Ontustik Kazelektro-montazh		Junction boxes	
KharikeinKumol'Munai	Bai-Mak, Darkhan-K PK, Vurt Kazakhstan, Vostokmash-zavod	Hand-tools		
KharikeinKumol'Munai	**Russia Oil Tools**			Pumps for drilling
KharikeinKumol'Munai, Tengizshevroil, Aktyubemunaigaz, Adzhip KKO	Instrumental'nyi zavod, Al'kor, Karaganda-instrument, Karagandinskii instrumental'no-tekhnicheskii zavod, Mezhdunarodnye ob"edinennye postavki, Zhaltur		**TOOLS**	
KharikeinKumol'Munai, Kazturkmunai, Tengizshevroil, Aktyubemunaigaz, Petro Kazakhstan Kumkol Resources, Karazhanbasmunai	Munaimash, VIKA, Aktobeelektrod, Evraziiskaya finansovaya-promyshlennaya, ZISTKO, Tynys, Avtomatika, VIKA, VF Poisk, Mangistau-KIP-Servis		**ELEC-TRODES, GENER-ATORS, THERMO-METERS, MANO-METERS**	

KharikeinKumol'Munai, Tengizshevroil, Adzhip KKO, Petro Kazakhstan Kumkol Resources, Karazhanbasmunai	Kazelektromontazh, Pavolodarmetiztsentr, Tekhno Impeks, Metallist, Zenit, Atyrauneftemash, Elektromontazh, Berkut Std, Serik i K, **Asyn P & L**	***NUTS, BOLTS AND WASHERS***		
KharikeinKumol'Munai, Kazgermunai, Tengizshevroil, Aktyubemunaigaz, Adzhip KKO, Petro Kazakhstan Kumkol Resources, Karazhanbasmunai	ELMO, Kentauskii transformer factory, AO Kainar, BM Energy Co, Zavod im.Kirova, Zavod malotirazhnykh dvigatelei, Almatyenergo-servis, AEMZ, Buran Boiler, Kazenergokabel', Almatinskii el.mekhanicheskii zavod, **ABB**, Bei Elektro, NPF Antikor, Unistar Tekhnolodzhi, VF Poisk, Kazelektromontazh, Terminal Plyus		**HIGH-VOLTAGE EQUIP-MENT, TRANS-FORMERS, ACCUM-ULATORS**	
KharikeinKumol'Munai	ELMO, Teploenergo-oborudovanie			Block input stations (Blochnye stantsii vvod

KharikeinKumol'Munai, Tengizshevroil, Petro Kazakhstan Kumkol Resources	Astel, Alonstelefonstroi		**Fibre-optic cables**	
KharikeinKumol'Munai	TNS-Servis		Batteries for radio stations	
KharikeinKumol'Munai, Tengizshevroil,Petro Kazakhstan Kumkol Resources	Avtoshtamp, SPZ		*bearings*	
KharikeinKumol'Munai	Komel		Computer spare parts	
KharikeinKumol'Munai, Tengizshevroil, Adzhip KKO, Petro Kazakhstan Kumkol Resources, Kazgermunai	Pozhtsentr TOR, Ural'sk-agroremmash, **UBS Internat-ional, Fitech engineer-ing, Trading LTD**, Pozhtsentr TOR, Russia oil tools, Tynys		**FIRE-FIGHTING AND FIRE PRE-VENTION EQUIP-MENT**	
KharikeinKumol'Munai	Temirbeton	Lamp-posts		
Kharikein-Kumol'Munai, Petro Kazakhstan Kumkol Resources	**Siemens**, PF Elektroservis, Safar KZ, Aziya Elektrik		**ELEC-TRICAL SUPPLIES**	
KharikeinKumol'Munai, Adzhip KKO	CSSI		Pump and pressure sleeves	

Adzhip KKO	**Aiex Service**		Photocopiers	
Adzhip KKO, Petro Kazakhstan Kumkol Resources	**Asia Linea Group**, Astel		*Telephones*	
Adzhip KKO, Tengizshevroil, Aktyubemunaigaz, Karazhanbasmunai	Gidromash Orion, RMZ Shapagat, Dormash		***CARA-VANS, MOBILE HOMES***	
Adzhip KKO	Tasmik		*Motors and hydraulic oils*	
Adzhip KKO	Gidromash Orion		**Refriger-ation equipment**	
Adzhip KKO	**OTS-Corporation**, Tekhnologii Kommunikatsii			**Radio equipment**
Adzhip KKO	**EATC Hilti-Leica Centre**		*Measuring equipment*	
Adzhip KKO	Kazsecur		*Security equipment*	
Adzhip KKO	KIOS	**Scrapers for cleaning pipes**		
Adzhip KKO	Zenit	Boat-hooks (shlyupoch-nye kryuki)		
Adzhip KKO	**CCC Market**		**ISO containers**	
Kazgermunai, Kazturkmunai	Nauka-Vostok, PZTM			Equipment warming oil
Kazgermunai	Pavolodartekhenergo			*Impulse-2 facility*

Kazturkmunai, Karazhanbasmunai	Atyrauneftemash, Berkut Std, Promtekhnoservis, Munaikuriliservis			**PUMPING JACKS (STANKI KACHALK**
Kazturkmunai	Al'kor		Stuffing-box	
Kazturkmunai	Aktyubinskii zavod metallokonstruktsii	Metal shelves		
Kazturkmunai	Aktobemunaifinans	Connecting pipes		
Kazturkmunai	Akbet			**Metal indicator of viscosity**
Tengizshevroil	Shchuchinskii kotel'no-tex.zavod, Buran Boiler		**STEAM BOILERS**	
Karachaganakskaya Integrirovannaya Organizatsiya	Nauka-Vostok, Kelet, **UBS International**		**Ventilators, heaters (for heating oil)**	
Tengizshevroil, Aktyubemunaigaz, Petro Kazakhstan Kumkol Resources	Aziya elektrik, Kvant		**ELEC-TRICITY METERS**	
Tengizshevroil	Prommontazh-KiV			Mechanical work relatin sulphur (Mekhan-icheskie rab po sernoi ka No.9)
Tengizshevroil	UK kondensatornyi zavod		Condensers	
Tengizshevroil	Bronetankovyi remontnyi zavod		Off-road vehicles	

Tengizshevroil	Kommunal'noe mashinostroenie		Washing centrifuges	
Tengizshevroil	Arsan/Omega		|Power boxes (Elektrich-eskie silovye shkafy)	
Tengizshevroil, Aktyubemunaigaz,	Ural'skii armaturnyi zavod, Universal, Arma-Servis		**SEALING EQUIP-MENT**	
Tengizshevroil	Trei-Karaganda		Sensors	
Tengizshevroil	Elektronmash		Castings press	
Tengizshevroil, Aktyube-munaigaz	Zavod nestandartizirovanno go oborudovaniya, zavod Arsenal, Aktyubinskii zavod metallokonstruktsii			**Bespoke equipment**
Tengizshevroil, Aktyubemunaigaz	Kran-Treid, Stal'montazh		Overhead cranes	
Tengizshevroil	Litmashkomplekt	Castings		
Tengizshevroil	Ekskavator	Excavators		
Tengizshevroil, Aktyube-munaigaz	Elektroapparat, Kul'sarypromsnabser vis		*Switching devices*	
Tengizshevroil, Aktyubemunaigaz, Petro Kazakhstan Kumkol Resources, Karazhanbasmunai	AZTM, Al'kor, PZTM, Georgievskii remontnomekhaniche skii zavod, VF Poisk, MTS Grupp, Adonis		**COM-PONENTS FOR PUMPS**	
Tengizshevroil	Nauchno-proizvodstvennaya firma		Water purification plant	

Tengizshevroil	**ABB**		*Electric motors*	
Tengizshevroil	NII Gidropribor		*Prefabricated plate for boiler*	
Tengizshevroil	Intergasstroi		**Wagon-container**	
Tengizshevroil	Kaspiiinterproekt		**Electrical spare parts for autos**	
Tengizshevroil	Mai Tau		**Greased compressor (Shevron Tegra)**	
Tengizshevroil	**Korporatsiya OTS**		Radio transmitter	
Tengizshevroil	**Schlumberger Logiko**		**Adapters (pere-khodniki) for drilling pipes**	
Tengizshevroil	**Universal'nye biznes-sistemy**		**Mail-server equipment**	
Aktyubemunaigaz	Aktyubinskii zavod metallokonstruktsii		Cement mixers	
Aktyubemunaigaz	UK kondensatornyi zavod		Safety devices	
Aktyubemunaigaz	KZELTO	Casings and couplings		
Aktyubemunaigaz, Adzhip KKO	Mashzavodishmer, Gidromash Orion		**Welding aggregates, equipment**	
Aktyubemunaigaz, Adzhip KKO	Astana-Metran, **Compass Service, ALSI, UBS International**		***COM-PUTER, IT EQUIP-MENT***	

Aktyubemunaigaz, Adzhip KKO	Gidromash Orion, Vasilets, Metalloizdeliya	*Metal cupboards*		
Aktyubemunaigaz	ZIKSTO	**Fittings** (metizy)		
Karazhanbasmunai	Selena			**MISCEL-LANEOUS OIL EQUI MENT**
Karazhanbasmunai	Korando-Plyus		**REDUCT-OR**	
Karazhanbasmunai	Terminal	**Ball-cocks** (shar krany)		
Karazhanbasmunai	Komeks		**Equipment for electric furnaces**	
Karachaganakskaya Integrirovannaya Organizatsiya, Adzhip KKO, Petro Kazakhstan Kumkol Resources	TNS Plyus, AV Servis, **UBS International**, Kazinformtelekom, Aiystel, TST Telekom, TV-Lyuks, Tekom			***TELECOM EQUIPME***
Karachaganakskaya Integrirovannaya Organizatsiya	KIOS		**Measuring diaphragms** (izmeritel'nye diafragmy)	
Karachaganakskaya Integrirovannaya Organizatsiya	**Consolidated Suppliers**		Regulator	

Key:

Aggregate value of contracts, Jan-July 2003:

Radio transmitter = $0 - 1,000

Electric motors = $1,000 - 10,000

Mail-server equipment = $10,000 - 100,000

COMPONENTS FOR PUMPS=$100,000 - $1 m

CARAVANS, MOBILE HOMES= >$1 m

Safety devices = not known

Supplier firms with element of foreign ownership: **UBS International**

Source: Ministry of Trade and Industry

10. The importance of certification

10.1. Kazakhstan's system of certification is in a process of transition. The main priority of the Committee for Standardisation, Metrology and Certification (*Gosstandart*) is transfer from a system of compulsory state standards to one of voluntary standards. (See also *Innovative Industrial.....,* 2003, p.44) The main vehicles for the implementation of this change-over are the 49 Technical Committees, created in line with the recommendations of the *Innovative Industrial Development Strategy,* that consider certification issues for specific sectors. There are committees for engineering and for light industry. These committees do not always function efficiently, and key stakeholders are not always integrated into their work. And the work of the committees is not effectively coordinated with the work of international technical committees. But the committees are increasingly active, and will play a key role in the transition to voluntary standards. Key bottlenecks here are shortage of accreditation agencies and of accredited testing laboratories (Izdibaev, 2003). The *Innovative Industrial Development Strategy* lists the promotion of international accreditation in Kazakhstan as a key priority, but posits accession to the International Testing Laboratory Accreditation Association (ILAC) and the International Accreditation Forum (IAF) only as long-term goals.

10.2 It is clear that the gaps in the Kazakhstan system of certification may hamper individual companies, especially in relation to exports. But these are not critical barriers in the case of the engineering-based industries and light industry. Those are not laboratory industries, so that the issue of accreditation is not central here. And, as has been show in the case of the Almaty Heavy Engineering Works and Belkamit, there is nothing to stop individual companies from acceding to ISO or ASME (American Society of Mechanical Engineers) standards. For engineering companies, indeed, gaps in the Kazakhstan technical regulations (*tekhnicheskii reglament*) mean

that domestic standards are not really of central importance here, and Kazakhstan engineering companies do not generally work closely with the Standardisation Committee. In light industry, by contrast, the technical regulations are more complete; textile companies work closely with the committee, and work to Kazakhstan or CIS standards.

10.3 With the prospect of Kazakhstan joining some international accreditation organisations, including the crucial International Electronic Commission, in the near future, and with the further prospect of WTO membership, certification problems will become less important over the next few years. But companies will always need certification for their products, and in the case of engineering-based sectors, that effectively means international certification. International certification is not costless. Most Kazakhstan engineering companies are now effectively SMEs, in that they employ fewer than 500 people, and it came through clearly in the interviews that companies operating on that scale, and faced with the imperative need to reequip on a broad front, simply cannot afford to go through all the certification procedures they would like to go through. *Government support for the international certification process, including some financial support for individual applications, would help greatly to increase or maintain competitiveness, particularly on the more dynamic, long-term perspective. It would effectively support the best and most innovative Kazakhstan companies, but without in any way infringing the rules of the 'level playing field'.* It might be possible to combine this kind of support with the 'Best Product of Kazakhstan' and 'For Achievements in the Sphere of Quality' prizes established by the *Innovative Industrial Development Strategy.*

11. Human capital formation

11.1. Human capital endowment is an important factor of competitiveness for all sectors of manufacturing. In the case of the engineering-based sectors, it is absolutely central. It is generally recognised in the advanced industrial countries that training is a key factor of economic development, one that becomes increasingly important as a given country closes the gap between itself and the leading countries. Thus the economic success of the US, Germany and Japan is, to a significant degree, attributable to the excellence of their training systems. The same pattern emerges at the microeconomic level. As the case-studies in Box 1 show graphically, human capital formation, in the form of building up the in-house knowledge base, training and retraining, has been a crucial element in the investment strategies of leading companies setting up production facilities in the transition countries. Box 1 also shows that there can be wide variation between individual firms, in terms of the degree of emphasis place on more academic retraining, on the one hand, and on-the-job retraining, on the other. But this is a question of balance, not of essence, and variations in the balance may quite properly reflect underlying technological differences between sub-sectors (NB making electrical and electronic equipment is more high-tech than making cars.)

11.2. In Kazakhstan, all the firms in light industry and the engineering-based sectors pursue in-house training and retraining programmes. In a number of cases, management personnel are sent for retraining in the West. Some firms are actively seeking Western partners, primarily as a vehicle for the organisation of retraining of

key personnel in the West. Again, our case-study material from Europe presented in Box 1 suggests that this is a perfectly realistic perspective. *But all of the Kazakhstan firms interviewed gave a very negative view of the role of the state in the process of human capital formation upgrading, and the general view is that the system of professional-technical schools had essentially broken down* (see also Yuritsyn, 2003, p.26). In the light of the commitment of the *Innovative Industrial Development Strategy* to the implementation of a 'dedicated programme ...for training specialists in different professions required for developing industry and high technologies' (p.34), this is a most serious matter.

11.3. It must be recognised here that the Kazakhstan state operates within tight constraints in terms of any item of government expenditure. Given the limited scope for government borrowing, increases in expenditure on education and training, if achieved at the cost of an increase in the government deficit, could endanger Kazakhstan's hard-won macroeconomic stability. The government also faces constraints from the demand side. On the whole, young Kazakhstanis prefer to look for employment in service and IT-based sectors, and to seek to enrol in training programmes to match. Thus only 17.8% of college graduates in 2002-03 were in subjects relating to industry and construction. And enrolment in the largely manufacturing-oriented professional-technical schools dropped by 17.7% between 1998 and 200 (*Kratkii....* (2003), p.34). Shop-floor jobs in manufacturing are not fashionable, partly, no doubt, because they are relatively poorly paid. The fact that most workers in manufacturing work with obsolete equipment, in conditions that have changed little since Soviet times, may also be a factor.

11.4. Not surprisingly, therefore, most engineering firms in Kazakhstan suffer from labour shortages in relation to specific shop-floor specialities, and some company directors fear that the human capital stock in their plants may eventually be dissipated. In the context of the financial weakness of many of the firms in engineering-based sectors and in light industry, and in the continued absence of foreign investments in Kazakhstan manufacturing on the scale of VW, Siemens, Grundfos's and Danfoss's investments in Eastern Europe (see Box 1), the state may have to take on a more proactive role in relation to training. It must be emphasised that here, as in relation to certification, *no amount of government action can cause any problems whatsoever with respect to the 'level playing field' principle*.

12. The implications of WTO membership

12.1. How much difference will WTO accession make to the target sectors? The simple answer is - not much. For Kazakhstan, as for other countries negotiating entry into the WTO, the difficult sectors are agriculture and services.

12.2. The Kazakhstan textile industry currently receives protection from a 7% import duty. There are currently no quantitative restrictions on imports of textiles into Kazakhstan, and there have been no significant measures of contingent protection (anti-dumping, safeguards etc) against Kazakhstan textile producers since 2000. There are no significant IPR problems in relation to the Kazakhstan textile industry. The import duty on textiles will likely be reduced by a few percentage points upon accession. The other conditions will stay the same. Thus the exogenous factors of

competitiveness affecting the Kazakhstan textile industry will not change critically after accession.

12.3. The Kazakhstan footwear industry is significantly more heavily protected than textiles. The average *ad valorem* tariff for this sector is 15%, and there is also a duty of Euro0.5-1.0 on each pair. So cheap shoes are more heavily protected than expensive ones. In addition, there is an export duty on hides, which has the same effect as an import duty on shoes. These dispositions reflect a government policy which aims to promote the processing of domestic raw materials - in this case animal skins. It must be supposed that Kazakhstan will have to reduce these duties substantially (probably to zero as far as the export duty on hides is concerned) on accession to the WTO. But this is a point of negotiation, and it is impossible to predict exactly.

12.4. The situation with respect to the engineering-based industries is rather more complex than in light industry. Much of the equipment that comes into Kazakhstan is imported duty-free, under special agreements with foreign investor companies. On the other hand, the agricultural machinery sub-sector enjoys a high level of protection, and there is a 40% import duty on tractors. Duties have occasionally been imposed on exports of scrap metal (mainly to China). These effectively constitute a measure of protection for domestic engineering companies. But the Kazakhstan government has been reluctant to make these permanent, because they encourage smuggling. Export duties on scrap have not, therefore, turned into the kind of major sectoral lobbying issue that they are in Russia and Ukraine. There are no major IPR issues relating to engineering-based sectors in Kazakhstan. There was a spate of anti-dumping actions in 1999-2001, many of them directed against imports of engineering goods for the oil and gas industries - cables, electricity and viscosity meters, generating equipment, pumps, fire-fighting equipment, overhead cranes and drilling tools. At present, however, no such measures are in effect.

12.5. As with textiles, WTO accession will mean some reduction in the level of protection of those engineering goods on which import duties are currently levied. In the case of agricultural machinery the reduction could be substantial. It should be noted, however, that if Kazakhstan manages to negotiate a significant degree of protection for agriculture from the WTO, some of the benefits of this protection may be passed on to the domestic agricultural machinery sector, to the extent that Kazakhstan farms buy their equipment from domestic agricultural machinery firms.

12.6. On balance, the short-term impact of WTO accession on the target sectors is likely to be marginal. The long-term impact is difficult to predict with certainty. But if accession produces the kind of general increase in inward investment that is generally expected, then engineering and light industry, industries starved of investment over a period of more than a decade now, are bound to benefit. Of course, increases in private investment would be selective. Not all companies would benefit, and some might have to be liquidated. But the result would be stronger, fitter and better equipped industries, which would be a huge advantage of terms of long-term competitiveness.

13. Conclusions

13.1. The question of competitiveness in engineering and light industry in Kazakhstan cannot be reduced to a mathematical formula. In the short run, in a functioning market economy with rational prices and effective competition, and in the absence of significant barriers to foreign trade, *company profitability* is the best indicator of competitiveness. With one or two exceptions,[6] these conditions already largely prevail in Kazakhstan, and they will be increasingly closely approximated over the next few years, as the Kazakhstan economy matures and as Kazakhstan moves towards accession to the WTO. As far as tradable goods are concerned, company profitability will, under those conditions, reduce to the 'ability of the national economy to produce exportable products', which the *Innovative Industrial Development Strategy* puts forward as an indicator of competitiveness (p.13).

13.2. One of the exceptions to this generalisation is agricultural machinery. This sub-sector has received substantial state support in recent years, and is heavily protected. These measures have achieved nothing. The sub-sector is no more competitive now than it was ten years ago. It would be better to remove subsidisation and protection from agricultural machinery and allow the companies involved to go bankrupt. The assets, notably the human capital assets of the sub-sector could then be redeployed by new companies, free from the legacies of the past, and able to respond flexibly to the needs of Kazakhstan agriculture. At that point, the basic short-term indicator - company profitability - can be allowed to reassert itself.

[6] Notably in relation to energy tariffs, which are still well below the level of efficiency prices. See *Innovative Industrial....* (2003), p.10.

Box 2: Levels of competitiveness in Kazakhstan companies in engineering and light industry: four 'typical' companies

Company A	Part of a production network inherited from the Soviet period, the firm has been unable to regroup its resources, either as a company serving domestic needs, or as part of a new, international, production network. It has made virtually no investments since the break-up of the Soviet Union, and its process and product technologies are those of the 1980s. It has done virtually nothing to develop soft technology capability. It survives on the basis of subsidies, and/or a high level of tariff projection. Company A is not competitive, and has no realistic prospects of becoming competitive in its present form. It should be closed down or fundamentally restructured.
Company B	Part of a production network inherited from the Soviet period, Company B has survived through a combination of downsizing and partial consolidation of former Soviet markets, including the domestic Kazakhstan market. There has been limited investment, but no fundamental restructuring of the production line or introduction of major new products. No major new markets have been conquered. The management system has been reformed and rationalised, but without any fundamental shift in emphasis towards management of design and marketing. Company B has been able to retain a core of highly skilled workers, but is pessimistic about its prospects of continuing to do so in the future. It has occasionally benefited from state programmes, but receives no significant on-going subsidisation or tariff protection. It is marginally profitable. Company B is currently competitive on domestic markets, but is unable to export outside the former Soviet Union. Its prospects of long-term competitiveness are poor unless it can find a partner that can bring in dynamic new technologies, hard and soft, and finance for investment.
Company C	Part of a production network inherited from the Soviet period, Company C has gone through a process of fundamental restructuring of management and shop-floor organisation. Huge economies have been made in the white-collar staff, in the use of inputs, and big improvements have been made in the level of labour discipline. Company C is competitive in current terms on both domestic and global markets. But basic process technology remains much the same as it was in Soviet times. No major new products have been introduced. Company C has been highly successful in modernising the soft technology dimension of its operations. It has, however, no clear vision of how process and product technologies and patterns of product demand are likely to develop over the medium-to-long-term future. Company C has good prospects of dynamic competitiveness over the coming years, but needs to free up more management resources for strategic thinking.
Company D	Company D is a newly established company which has drawn on knowledge and human resources inherited from the Soviet period. It operates with a small management and design team who implement an integrated innovation system, moving design, production and marketing forward simultaneously. This gives the company a nimbleness which

	enables it to respond quickly to varied demands from customers. Some of the equipment of the factory is inherited from the Soviet period, but much of it is new, and the process of renewal of the fixed capital stock is a continuous one. In combining elements of manufacture, design and organisation in its products, Company D comes close to the profile of a specialist supplier or specialist service company, such as dominate, e.g., the hydrocarbon supply industry in the West. It supplies not only big companies, but also small ones, e.g. mini-oil wells, where flexibility and ecological sensitivity is at a special premium. Company D is highly profitable, which allows it to plough-back substantial company resources into new investment and product development. In short-run terms, it is highly competitive. The management of Company D has clear ideas about how the profile of the company will develop over the medium-to-long-term future. They may need to develop a broader concept of strategic thinking, if they are to guarantee the future, dynamic competitiveness of the company.

Note: These portraits of 'typical' companies have been derived on a composite basis from interviews and press reports. None correspond to a single, actual company.

13.3. Another exception is leather and footwear. This sub-sector is heavily protected, though not as heavily as agricultural machinery. Unlike the latter sector, it is not a remnant of an old Soviet production complex. Rather it is a small-scale, local industry. The desire to develop local leather-based industries on the basis of local production of hides is a reasonable one. It is not clear, however, that protection is the best way to do it. There is an element of foreign investment here, which might point the way to a better solution to the problem.

13.4. We need to add one more qualification to this general conclusion on profitability as an indicator. Company profitability may cover a wide range of profit rates between different products, and aggregate profitability indicators may hide elements of *cross-subsidisation*, whereby some products make profits and some losses. For this reason, it is crucially important that companies should improve their accountancy procedures, particularly in cases where a wide range of products is produced, as is common in engineering and textile plants. The implication is that even profitable companies may sometimes have to rationalise their product ranges in order to maximise their competitiveness.

13.5. On the medium-to-long term the situation is more complex. But in relation to *dynamic competitiveness*, too, algebraic formulae should not be the starting point for the assessment of competitiveness. The approach must be essentially qualitative (though supported by clear perspectives on key quantitative indicators like real wages and labour productivity), based on an assessment of the technological opportunities and constraints likely to pertain over the 5-10-year perspective. In this report, we have used one particular methodology for classifying and analysing technological trends. We chose this methodology because it is simple, and because it requires only data that is readily available. Managers will undoubtedly devise their own methodologies, taking into account the technological peculiarities of their sectors. The important thing is that managers should recognise that they *must have a considered approach to dynamic competitiveness.* If a company does not have

managers who are continually thinking about what products they will be manufacturing in 5-10 years' time, how those goods will be manufactured, and on what markets they will be sold, *then that company is not dynamically competitive.* Reference back to Box 2 brings out one fundamental fact about Kazakhstan's engineering-based and light industries. *While many companies are competitive, if only marginally so, in the short run, none fulfil all the conditions for dynamic, long-run competitiveness.*

13.6. Strategic thinking usually involves thinking about the possibility of developing new specialisations, moving into new product ranges. But strategic choices have to be backed up by clear thinking about how the firm in question will *learn* to execute the new tasks efficiently. An obvious case in the present context is that of entry into the oil and gas supply industry. A number of existing Kazakhstan firms are considering the possibility of entering this market. Some are strong firms, seeking to consolidate their strength. Others are weak firms, searching desperately for a lifeline. In either case, they will have to establish some kind of strategic partnership with a company, whether from Kazakhstan or from abroad, which is already in the business and has an established corresponding knowledge base. And they will need to have something to offer their strategic partner in return. In the global economy, patterns of alliance between companies are rich, varied and ever-changing. The typical Kazakhstan company, in its isolation, has little experience of this kind of interaction with other firms. Here is a key area where maintenance of dynamic competitiveness will require that Kazakhstan firms *learn how to learn.*

13.7. Is there some general quantitative indicator which sums up trends in dynamic competitiveness? One possibility is to use value added. Thus the *Innovative Industrial Investment Strategy proposes* 'targeting the [sectors] with the highest value added'(p.13): high value added is certainly a feature of the export patterns of the most advanced economies. But it is an *effect* rather than a cause, an effect of the movement up the technological ladder which is forced upon those economies, just as it is upon catch-up countries. Sectors exhibit high value added because they pay high salaries. They pay high salaries on account of high levels of productivity and high endowment in human capital. If you pay high salaries without high levels of productivity you will simply make losses! So it is inappropriate, even dangerous, to use value added as a *target.* The target for the medium-to-long run should, in fact, be the same as the target for the short run - profit. But medium-to-long-run profit trends may be affected by a range of exogenous factors (which can be assumed to be constant in the short run). So if we want a medium-to-long-term competitiveness target that focuses on the endogenous factors of company development, we should focus on the efficiency with which the company uses and develops its resource base. We would suggest therefore, that the key dynamic competitiveness target should be *growth in productivity*, in the context of continual enhancement of the fixed and human capital stock.

13.8. We cannot end without once more stressing the importance of export markets. We have argued throughout that contact with the best firms is the best way for a given firm to learn how to raise its game, and that exporting is the best way to establish such contact. Another advantage of exporting, in terms of building competitiveness, is that it broadens the market, and opens up scope for exploitation of economies of scale. One of the reasons why Kazakhstan firms, e.g. in the steel industry, are not very

interested in building a position as suppliers to the domestic engineering industry is that the scale of demand from that industry, limited, as it is, largely to the domestic market, is too small. So domestic networking is weak because international networking is weak. We thus return to the theme of isolation. The competitive future for Kazakhstan companies, in engineering and light industry, lies in the development of *multi-level* networks of supply, procurement and technology which will allow those companies to make a reality of their underlying comparative advantage.

13.9. Where does government come into all this? We have stressed throughout the importance of the level playing field, and sought to bring out the potential importance of proactive government policy in areas like education and technical assistance for certification, *where the greater the role of the government, the more level will the playing field be.* During the 1990s the Kazakhstan government sometimes espoused policies, like the *import-substitution* programme, which went against the level-playing-field principle and effectively exacerbated the inherited isolation problem. The new *Innovative Industrial Development Strategy* document makes it clear that this kind of policy is now a thing of the past (p.27). But there are other areas of government policy which continue to go against the principle of the level playing field. One such area is that of public tenders. A number of the companies we interviewed said that the unsatisfactory nature of public tender procedures was one of the main barriers to competitiveness. In a country where many companies survive on the basis of public procurement, this is a key issue. A study of the conditions for competitiveness in Kazakhstan's engineering-based and light industries can hardly end without a plea for a review of government policy in this area. Another difficult area is government inspections. Despite efforts by the President to call a halt to 'petty tutelage' (*melkaya opeka*), companies can expect around fifteen inspections, including unscheduled ones, per year. No doubt there are often legitimate grounds for such inspections, in terms of tax payments and the like. But given that most of the companies involved are effectively SMEs, excessive inspection is not just an irritation. It wastes scarce managerial time, and it threatens to take away the main competitive strength of any small company – its nimbleness and mobility. The golden rule here, as laid out in the *Innovative Industrial Development Strategy,* is clear. 'The state neither can nor may provide financial support to specific companies, but it may and must catalyse and initiate competitiveness promotion, encourage modernisation and innovative initiatives of private companies this creating and improving their production and competitive potential.' (p.15). It must be recognised that at present some aspects of government behaviour go clean against that principle. Failure to resolve these problems could jeopardise the whole process of implementation of the *Innovative Industrial Development Strategy.*

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Note on further sources

The published sources cited above were supplemented by a series of interviews with civil servants and administrators with expertise and responsibility in related areas. In addition, the author interviewed the directors of six key companies from the targeted sectors.