Strategic directions on industrial policy in Mongolia

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Strategic Directions on Industrial Policy in Mongolia

Prepared for the Government of Mongolia
by the Development Policy and Strategic Research Branch,
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Preface

This study on *Strategic Directions on Industrial Policy in Mongolia* combines analysis of long-term structural change and the role of industrial policy. It takes into account the contributions of policy-makers, entrepreneurs, academics, directors of non-governmental organizations, officials from international organizations and other industrial stakeholders. The study suggests a strategy and a set of policies which aim to stimulate structural change into and within the manufacturing sector. Because of the importance of the mining sector for Mongolia's economy, one section of the study examines the options for moving from resource-based industries into higher value-added manufacturing activities.

In preparation for the study, two seminars were organized in Ulaanbaatar, Mongolia. The first seminar took place on 24-25 February 2010. The panelists in the workshop were Mr. John Weiss from the University of Bradford in the UK; Mr. Henrik Kuffner, an expert on wool and cashmere from the International Wool Textile Organization; and Mr. Ralph van Gelder, an independent consultant on meat processing. The Vice-Minister for Foreign Affairs, Mr. Bolor Bayarbaatar, the Vice Minister for Agriculture and Light Industry, Mr. Zoljargal Hhadbaatar, and Mr. Ludovico Alcorta, Director of the Development Policy and Strategic Research Branch of UNIDO, opened the event. Ms. P. Pacheco López presented a preview of the methodology used for policy design on the project. Presentations on aspects of industrial and sub-sectoral development were made by the following Mongolian government officials, national experts, and representatives of the private sector: B. Ganbat, Director, Innovation Policy Department of the National Development and Innovation Committee; Mr. Bolor Naranhuu, national consultant; Mr. G. Yondonsambuu, Vice President of the Mongolian Wool and Cashmere Association; Mr. S. Gankhuyag, national consultant; Mr. B. Batkhuu, Director, Mining and Heavy Industry Department of the Ministry of Mineral Resources and Energy; Mr. T. Tamir, Sub-Division Director of the Mining Division of the Mineral Resources Authority of Mongolia; Mr. M. Lhachinbal, Chair of the Mongolian Meat Association; Mr. Ch. Ganbat, Adviser to the Minister of Roads, Transport, Construction and Urban Development.

The second seminar took place on 3-4 June 2010. The Director of Trade and Economic Cooperation of the Ministry of Foreign Affairs, Mr. G. Jargalsaikhan, the Director of Light Industry Policy Implementation and the Coordination Department of the Ministry of Food, Agriculture and Light Industry, Mr. D. Badarch and Mr. Ludovico Alcorta, Director of the Development Policy and Strategic Research Branch of UNIDO, opened the event. The panelists were a group of international industrial policy experts assembled by UNIDO, and comprised Mr. John Weiss; Mr. Graham Davis from the Colorado School of Mines in the USA; Mr. Henrik Kuffner; and Mr. Ralph van Gelder. Presentations on different aspects of industrial and sub-sectoral development were made by Mongolian government officials, national experts, and representatives of the private sector: Mr. R. Batmend of the Mongolian Institute for Strategic Studies; Mr. B. Ganbaatar, Director, Sectoral Development and Investment Policy Co-ordination Department of the National Development and Innovation Committee; Mr. B. Battulga, Officer, Innovation Policy Department of the National Development and Innovation Committee; Mr. G. Yondonsambuu, Vice President of the Mongolian Wool and Cashmere Association; Mr. D. Enkhtuya, Director, Mongolian Textile Institute; Ms. L. Boojoo, Executive Director of the Competitiveness Centre, an NGO; Mr. B. Batkhuu, Director, Mining and Heavy Industry Department of the Ministry of Mineral Resources and Energy; and Mr. J. Baatarkhuu, General Director in Charge of Enrichment, Erdenet Mining Corporation.

The study will contribute to Mongolia's industrial policy-making process. Mongolia is currently at a crucial juncture in its development process and key strategic decisions are being taken to ensure long-

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term sustained growth. Industrialization will play a leading role in it and UNIDO is pleased to accompany the country in this major endeavour.

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The report, *Strategic Directions on Industrial Policy in Mongolia*, was prepared by Ms. Penélope Pacheco López, UNIDO staff member, under the overall supervision of Mr. Ludovico Alcorta, Director of the Development Policy and Strategic Research Branch of UNIDO.

Background papers on specific inputs for the study were commissioned from Mr. John Weiss, Mr. Graham Davis, Mr. Ralph van Gelder and Mr. Henrik Kuffner.

Project management support was provided by Mr. Amadou Boly. Secretarial support was provided at different times by Ms. Iguaraya Saavedra and Ms. Monika Marchich-Obleser. Mr. Ömer Aksoycan contributed statistical data.

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Abbreviations

ADB	Asian Development Bank
EBRD	European Bank for Reconstruction and Development
FAO	Food and Agricultural Organization
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
HACCP	Hazard Analysis Critical Control Point: quality assurance programme
HHI	Herfindahl-Hirschman Index
ICT	Information and Communication Technologies
IMF	International Monetary Fund
ISIC	International Standard Industrial Classification
IWTO	International Wool Textile Organization
MFN	Most Favoured Nation
MMAB	Mongolian Meat Administrative Body
MMIB	Mongolian Meat Industry Board
MNT	Mongolian Togroks
NICs	Newly Industrializing Countries
NPV	Net Present Value
NSO	National Statistics Office of Mongolia
OECD	Organisation for Economic and Co-operation and Development
R and D	Research and Development
SITC	Standard International Trade Classification
SME	Small and Medium Enterprises
SWF	Sovereign Wealth Fund
TPY	Tons per year
UNDP	United Nations Development Programme
UNIDO	United Nations Industrial Development Organization
WTO	World Trade Organization

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Contents

Disclaimer **2**
Preface **3**
Acknowledgements **5**
Abbreviations **6**
Contents **7**
List of Tables **8**
List of Figures **8**
List of Boxes **9**
Appendices **9**
Strategic Directions on Industrial Policy in Mongolia **10**
1. Introduction **15**
2. Challenges for Industrial Development in Mongolia **17**
2.1 The Recent Performance of the Manufacturing Sector 17
2.2 The Dynamics of the Manufacturing Sector 20
2.3 The Role of Government in Supporting Manufacturing Industry 25
2.4 Industrial Policy in Mongolia 28
2.4.1 Long Term Finance 30
2.4.2 Foreign Trade and Transport Costs 33
2.4.3 Investment Climate 35
2.4.4 New Technologies and Skills Development 37
2.5 Mongolia: Export Structure and Comparative Advantage 38
2.6 Summary 42
3. The Mining Sector **43**
3.1 Introduction 43
3.2 Distinctive Characteristics of the Mining Industry 44
3.3 Mineral Markets for Mongolia 44
3.4 Processing Minerals 46
3.5 Limitations for Processing Minerals 48
3.6 Government Intervention 51
3.7 Summary 53
4. Natural Fibres Industry **54**
4.1 Introduction 54
4.2 Raw Materials and Textiles 55
4.2.1 Raw Materials 55
4.2.2 Textiles 61
4.3 Prospects for the Industry 61
4.4 Summary 63
5. The Red Meat Processing Industry **66**
5.1 Introduction 66
5.2 World Meat Market Situation and Mongolia's Supply Capacity 67
5.3 The Mongolian Meat Processing Industry 69
5.3.1 The Mongolian Meat Market and Production 69
5.3.2 The Quality of Red Meat 72

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5.4 The Mongolian Meat Processing Industry 72
5.4.1 Meat Pricing in the Domestic Market 72
5.4.2 Market Price Comparisons for Meat in Mongolia and Australia 73
5.4.3 Limitations on Developing the Mongolian Meat Processing Industry 75
5.5 Policies to Improve the Meat Processing Industry 75
5.6 Summary 77
6. References 80

List of Tables

Table 1. Manufacturing growth and GDP share 1996-2008 18
Table 2. Composition of manufacturing in 2008 (at 2005 constant prices) 19
Table 3. Mongolia's employment structure 19
Table 4. Industrial policy taxonomy 27
Table 5. Mongolia Millennium Development Goals-based Comprehensive National Development Strategy: Key Industrial Policy Interventions 29
Table 6. Mongolia: interest rates (%) 30
Table 7. Comparative rail freight costs 35
Table 8. Doing Business Indicators 2010: selected indicators and countries 36
Table 9. World Bank Enterprise Survey 2009: selected results 37
Table 10. Technology and innovation in Mongolian manufacturing firms (2004) 37
Table 11. Training in Mongolian manufacturing firms 38
Table 12. Mongolia's comparative advantage in 2006 39
Table 13. Mongolia's textile exports 40
Table 14. Mongolia's Top 25 product categories by contribution to EXPY 2006 41
Table 15. Industrial features of minerals 45
Table 16. Number of Goats and Production of Raw Cashmere in Mongolia 55
Table 17. Exports of Cashmere Products 56
Table 18. Cashmere processing capacity by company 57
Table 19. Comparison of raw cashmere quality (2009) 58
Table 20. World meat estimates for 2010 68
Table 21. Livestock numbers in various years and recent meat output 70
Table 22. Meat production and consumption in Mongolia ('000 tons) 71
Table 23. Margin per kilogramme from Mongolian meat trading 73
Table 24. Australian wholesale and retail values and retail margins 74
Table 25. Australian domestic beef (values for half carcass) 74

List of Figures

Figure 1. Net imports of copper concentrate ('000 tons per year) 50
Figure 2. Net imports of iron ore (million tons per year) 50
Figure 3. Estimated annual Mongolian Government revenues from Oyu Tolgoi, by source 52

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List of Boxes

Box 1. PRODY and EXPY methodology 22
Box 2. Export sophistication and economic growth 23
Box 3. Mongolia and cross country patterns for manufacturing 24
Box 4. Cost of credit in on-lending operations 32
Box 5. Protection due to transport costs 34
Box 6. Economics of mineral processing 48
Box 7. Distinctive characteristics of the red meat industry in Mongolia 70

Appendices

Appendix 1. Main natural fibre companies 64
Appendix 2. Abattoir capacity in Mongolia 2010 78

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Strategic Directions on Industrial Policy in Mongolia

Mongolia possesses major reserves of 80 different minerals including copper, gold, coking coal, iron ore, fluorspar, molybdenum, and crude oil. The Oyu Tolgoi mine, in particular, is potentially the world largest copper mine. Unsurprisingly, the Mongolian economy has relied on its mining sector and the high prices of minerals in international markets for economic growth. However, the time has come for Mongolia to use revenues from mineral reserves to grow even faster by inducing a rapid transformation of the economy and, as a result, improving significantly the living standards of its people. To do so, the development of a competitive and high value-added manufacturing sector is crucial.

Several Mongolian official documents–including *The Action Plan of the Government of Mongolia for 2008-2012; The Millennium Development Goals-Based Comprehensive National Development Strategy of Mongolia*; *The Action Strategy and Formation Plan of the National Development and Innovation Committee*; *The List of Initial High Priority Large Projects to be Announced to Foreign and Domestic Investors by Government*; and *The Detailed List of Large Priority Projects to be Implemented by the Government* – show the importance that the Government is giving to the development of an industrial programme. The goals are ambitious and involve developing a range of new industrial activities. To reach those goals and realize such ambitious projects, many obstacles will have to be surmounted.

The manufacturing sector is small and accounted for only 4.3 per cent of gross domestic product in 2008. Of the total economically active population of around 1 million people, only 48,000 were employed in the manufacturing sector. The small overall population limits the size of the domestic market. The challenge is thus to identify those manufactured products that it is feasible to support initially, in the sense that they use local raw materials, can be produced economically and compete in international markets. Empirical evidence has shown that countries that produce and export manufactured products experience faster long-term growth and are eventually able to diversify into even more advanced industries.

This report, *Strategic Directions on Industrial Policy,* is based on an assessment of the current characteristics of the manufacturing sector, its contribution to the overall economy, the prevailing macroeconomic and institutional circumstances of the country, and its performance relative to other countries at the same stage of development. The aim is to define an industrial development strategy and make recommendations on industrial policy that may help turn the industrial development goals and projects of the Government of Mongolia into reality. The development of Mongolia's manufacturing is essential if it is to weather the shocks associated with the volatile minerals markets. Historical and current empirical evidence show that countries which produce and export manufactured products have experienced a more stable economic performance, especially if their products are in demand in high-income countries. The report is based on rigorous research assessing the performance of Mongolia's most important sectors such as minerals, natural fibers and meat processing, but also suggests new areas of comparative advantage.

Mongolia is a land-locked country, where distances are huge and transport costs high. Every effort needs to be made to improve the transport infrastructure to lower transport costs. Additionally, an adequate and high-quality physical infrastructure should be built for production to be efficient and competitive. The institutional structure needs to be conducive to doing businesses. This means strengthening property rights and the rule of law, and reducing the bureaucratic procedures for setting up businesses. For industry to flourish, it must also have access to skilled professionals. Investment in

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education and training for specific industries should be seen as a key priority. Likewise, information and technology (IT) skills and foreign languages are of generic importance.

An active dialogue between the Government and private sector must also be maintained to identify market failures and what the private sector sees as 'binding constraints' on industrial growth, so that the Government can target their removal. However, to achieve the goals, all parties including the Government, firms, industries and professionals, must take coordinated actions toward transformation.

The industrial strategy will be based on two main pillars. First, improving the quality of manufactured products for specific niche markets. The country could improve the quality of those products which require unique Mongolian raw materials, design or processes. The establishment of a marketing structure and trade associations is vital to promote traditional products of Mongolian origin. There is great potential for exports of high value-added industrial products based on cashmere, yak hair, sheep's wool, camel hair and red meat. Second, aggressively promoting Mongolian products in international markets. Participation in specialized fairs, branding and active promotion of the products are examples of what could be done. In sum, Mongolian manufactures should be recognized for their quality, their unique identity and by price differentiation, for all of which a coherent marketing strategy is required.

The success of the industrial strategy will be determined by the Government's ability to: i) manage and use the revenues generated by the extraction of minerals and ii) decide which minerals to process. Regarding the former, a properly regulated and structured financial institution has to be established. Mongolian entrepreneurs wanting to produce manufactures need to have access to funds, which should be conditional on medium-term performance. Part of the sustainability of the financial institution would depend on a body of trained inspectors in charge of monitoring the small and medium-sized enterprises (SMEs) which seek its funds. Any move to support mineral value-added processing activities must be undertaken only after assessment of the profitability of each capital investment, identified through rigorous financial and technical analysis. For those processed minerals oriented towards international markets, the selection of export markets is a key issue. But there could also be social benefits, such as employment generation, when selecting a basket of processed minerals oriented to satisfy the domestic market.

The vision is that in 20 years' time, Mongolia will have a much more diversified economy. Manufacturing industry will be a major driver of economic activity, with production taking place in modern, high-tech, environmentally friendly and resource-efficient plants. Most of its population will enjoy high -quality employment and higher incomes and the standards of living of the Mongolian population will begin approaching those of developed countries.

Priorities for Industrial Development

There is great potential to enhance the performance of the Mongolian industrial sector. For it to prosper, a set of issues needs to be addressed. Development of Mongolia's plentiful mineral resources offers the opportunity for significant diversification, including the expansion of manufacturing. The role of government would be to co-ordinate the responses of market participants to ensure that bottlenecks are overcome. The following are the priorities identified.

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It is critical to overcome the shortage of long-term finance for investment and it will be necessary to use mineral revenues to fund the diversification of the economy.

1. Mongolia's economic development requires the channelling of long-term investment funds into the manufacturing sector. Funds for new activities – whether defined as new to the country or as new ways of doing things – should be channelled through a Development Bank, a venture capital fund or an alternative financial intermediary. The Development Bank should lend at preferential rates (based on international interest rates with an adjustment for administrative costs).
2. For employment purposes, a separate fund for SMEs (defined as enterprises with less than 50 employees) should be created. Funds should carry an interest rate that reflects risk-free returns abroad plus administration charges. SMEs should not be expected to bear foreign exchange risk.
3. A Sovereign Wealth Fund (SWF) should be created to invest some of the mineral revenues in foreign-exchange-denominated assets to sterilize the impact of mineral revenues on the exchange rate and to create a fund to offset downturns in mineral prices.
4. A Technology Development Fund should be set up to cover the cost of the import and/or local development of new technology and the cost of employment of foreign experts. Loans offered under this fund should be small (say, a maximum US$10 million per loan) and offered interest-free.
5. Enterprises from all sectors of industry should be eligible to apply for funds, but failure to repay would render the enterprises and their owners ineligible for further financial support for a significant period of time (say, ten years).

Planning for the future development of the mineral sector is critical. It cannot be assumed that a strategy for processing minerals is always economically feasible.

6. The planning capacity of the National Development and Innovation Committee and other bodies dealing with the mineral sector should be strengthened by a combination of training for local staff and the involvement of foreign advisers and consultancy firms. Detailed work must be carried out that meets rigorous international standards and leads to sound technical advice.
7. It may turn out that it is economically more advisable for Mongolia to run a dual economy, exporting selected unprocessed and processed minerals and expanding resource-based manufactures (like textiles, cashmere, and food products), initially funded by the mining sector.

Improvements to the investment climate must continue.

8. Ongoing initiatives to reduce the cost of doing business, for example through investment in infrastructure, the streamlining of bureaucratic processes and the strengthening of legal protection must be maintained.

Institutional change at sector level will be essential to allow modernization.

9. Co-ordination among the different official entities dealing with the same areas (for example, between the Ministry of Finance and the Ministry of Food, Agriculture and Light Industries) is necessary in order to make policy consistent.

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10. There needs to be dialogue between the Government and the private sector where bottlenecks and market failures are identified. The Government must play a co-ordinating and facilitating role to remove these. This is well argued in the literature (Hausmann, Rodrik and Velasco; 2005), and is known as easing the "binding constraints" on growth.

11. Strong industry associations, independent of the Government, must be supported, for example in meat processing. These associations must be allowed to engage directly with the Government to discuss their perceptions of the problems facing their sector. The development of associations where no strong ones exist may require some public funding.

12. Mongolian entrepreneurs and SMEs require short- and medium-term support from the Government, in the form of "carrot and stick". Entrepreneurs willing to take the risks involved in setting up a firm must have access to advice and funds from the Government. The time-frame for support should be fixed, and continued support should be conditional on good performance. Failing this, the entrepreneur would be penalized by terminating the funding. The process would require close supervision. Companies trying to initiate activities in both traditional industries and new manufacturing activities could benefit from this scheme.

13. The Government has to support risk-taking activities that are genuinely new to Mongolia and represent a major shift away from current specialization, for which the Government may wish to select a priority area.

14. Improvements in the quality of natural fibres (cashmere, yak hair, sheep's wool and camel hair) are essential to secure a position in international markets. This implies adopting and implementing international standards. Improving the quality of natural fibres necessitates the informed and active participation of herders.

15. Specifically, in the cashmere sector, the relationship between herders and processors must be strengthened. The advisability of establishing a cashmere commodity exchange, involving herders' associations and processors, should be assessed.

16. For the meat industry to succeed in international markets, attention should be paid to the quality of inputs along the meat processing chain. Price differentiation must be implemented so that prices are linked to the cuts and quality of meat.

17. Priority support should be given to manufactured minerals already being exported (SITC Rev2: Copper and copper alloys, refined or not, 6821; Copper and copper alloys, worked, 6822; Aluminium and aluminium alloys, worked, 6842; and Lead and lead alloys, worked, 6852) or ones close in nature to them, and other products in the SITC 68 category, non-ferrous metals. These products are likely to require similar skill sets and institutional knowledge. Identifying export markets will be key to this effort.

Consistent implementation of measures is needed to correct market failures and to promote new activities.

18. A wide range of measures to promote the development of manufacturing activities should be introduced: tax holidays, Export Processing Zones, labour training subsidies, tax concessions, etc. The support should be for broad sectors, without favouring individual sub-sectors.

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Mongolia is a labour-surplus economy and its diversification needs to be built around a strong base of local skills.

19. The government should invest in education and technical training, in particular strengthening the capacity of the labour force in English language and ICT skills and in specialist aspects of industry like cashmere processing.

20. Skilled labour is needed for each industry. The country could establish agreements with other governments, chambers of industry and commerce, or appropriate companies to train personnel in specific tasks.

Mongolia has to take into consideration the rapidly changing environment to identify what products are in greatest demand in the most dynamic markets.

21. The methodology used in this report suggests that Mongolia could produce and export higher-value textile products, which would be easier than moving to brand new activities. Higher-value textiles are "nearby" products in its "product space", where economic distance is low, due to the similarity of the assets and capabilities they require.

22. The opportunity for Mongolian manufactured products lies in selected niche international markets.

23. The country should consider comparator countries, such as Uruguay and Botswana, which have similar characteristics (a relatively large territory and a small population dependent on a few commodities and a narrow range of manufactures), as potential models to follow.

Mongolia can undoubtedly become a more diversified economy than it is now, but the pace of diversification will depend on the industrial policies pursued by the government and the responsiveness of the private sector to the inducements to invest in new areas of activity. Note however that industrial (manufacturing) development is not the only route to diversification. Service sector development (including tourism) can be a complement to industrialization, but is outside the scope of this Report.

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1. Introduction

Mongolia faces critical policy challenges. Its large mineral reserves give it the potential to grow rapidly and raise living standards significantly. However, international experience shows that mineral reserves do not guarantee prosperity and that the rents from their exploitation need to be invested wisely to ensure that growth can be sustained once they are depleted. There has recently been wide coverage in the international media of the high potential growth that the economy could achieve on the basis of investment in its mining sector. Indeed, Mongolia is one of the richest countries in the world in terms of mineral endowments, and international prices of minerals have been booming. Therefore, there are high expectations for mining projects. However, there are also concerns about the economy's capacity to cope with the requirements of these ambitious projects.

During the mid-1990s Mongolia experienced a radical change in its economic regime. This involved the rapid opening-up of the economy to foreign trade and the privatization of most of the larger industrial enterprises. With entry to the World Trade Organization (WTO) in 1997 all tariffs were eliminated for a two-year period. They were re-imposed at a uniform rate of 5 per cent in 1999, which remains the current rate (UNDP, 2008: 16).

This trade regime has been criticized from different standpoints for causing the very rapid decline of the manufacturing sector in the 1990s. One criticism is that, although the old manufacturing sector may have been inefficient by world standards, it was a source of jobs, income and industrial expertise and that the rapid opening of the domestic market to imports meant that skilled industrial workers were driven into low-productivity jobs in the informal sector, such as herding, agriculture or artisanal mining (Reinert, 2004). Trade policy has also been criticized for not making full use of the instruments allowed by WTO membership to support industry. For example, selected parts of manufacturing could have been granted higher rates of protection than the low standard rate, since the bound import tariff ceiling at accession to WTO was set at 20 per cent. Nor has the country made use of WTO provisions on trade remedies, not applying them to local producers affected by temporary import surges (UNDP, 2008: 12).

The main objective of this report is to suggest directions for industrial policy to the Government of Mongolia, with the aim of diversifying into higher value-added industrial activities. The report is based on rigorous research assessing the performance of Mongolia's most important sectors: minerals, natural fibres and meat processing as well as suggesting new areas of comparative advantage. It summarizes the findings of two workshops which took place in Ulaanbaatar, Mongolia (on 24-25 February 2010 and 3-4 June 2010), at which Mongolian officials, UNIDO officials, international experts, entrepreneurs, academics and representatives of non-governmental organizations (NGOs) discussed industrial policy issues.

The report contains five chapters. The first chapter briefly introduces the topic of industrialization in Mongolia and raises concerns about the ability of the economy to cope with ambitious new projects.

The second chapter discusses the recent economic performance of Mongolia and its manufacturing sector. It considers the role of industrial policy in the development of new sectors of the economy that would allow the country to achieve a more sustainable long-term economic performance which is not wholly dependent on minerals. A recently proposed methodology which involves the construction of two indices, PRODY and EXPY, developed by Harvard economists (among them Ricardo Hausmann, Jason Hwang and Dani Rodrik), is followed. The methodology quantifies a country's position in the value added chain. In the case of Mongolia it transpires that its export basket has remained very

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concentrated over time and its export structure is producing lower value- added products than other countries at comparable levels of income.

The next three chapters are studies of sectors which are of relevance for Mongolia because of their current economic contribution and their potential. The sectors are mining, natural fibres and red-meat processing. The possibility of processing some of the raw materials produced in the mining sector is explored in Chapter 3. However, it is argued that it cannot be assumed that mineral processing is economically viable. This applies to both copper smelting and coal cleaning as well as to a range of metallurgical activities. In the short run the country should continue to extract and export mineral products. Any decision about processing minerals can be taken only after detailed profitability analyses have been done.

In Chapter 4 the current characteristics of the natural fibres industry are examined. If Mongolian natural fibre products are to access international markets, the first step is to improve the quality of the raw material. Once the quality of the fibre is guaranteed, design, production and marketing of garments have to be addressed. Mongolia should identify and target niche markets.

Chapter 5 addresses the upgrading of the red-meat industry. It discusses its current situation and suggests the changes that need to be made in its organization, the management of animals on farms and the processing system. It emphasizes that the Mongolian meat industry needs to become "consumer-focused" rather than being almost entirely "production-focused" as it is at present. Two of the main recommendations are the implementation of a price differentiation system in relation to the cuts and quality of the meat and the establishment of producer associations in which the private sector should be represented. The establishment of a Mongolian Meat Industry Board (MMIB) and a Mongolian Meat Administrative Body (MMAB) are recommended.

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2. Challenges for Industrial Development in Mongolia

2.1 The Recent Performance of the Manufacturing Sector

Mongolia has a number of highly distinctive features because of its geography and history. The large, and in many parts inaccessible, land area and small population give it an extremely high land/labour ratio and make transport costs a relatively significant element in manufacturing costs. In addition, its land-locked location presents major barriers to foreign trade. Transport costs are high even by the standards of other Central Asian land-locked economies, due to the difficulties in modernizing the rail network because of the cost of upgrading so many tracks. These high transport costs provide natural protection for producers selling in the small domestic market, but at the same time make it more difficult to export, particularly goods with low value-to-weight ratios. Several non-geographic problems have also been highlighted in recent reports, including a shortage of long-term credit because of a poorly functioning financial system, a weak investment climate with corruption and non-transparency as particularly serious issues, and a shortage of skills including low levels of competence in the English language (UNIDO, 2002; World Bank, 2007a; UNDP 2008). In addition, Mongolia has serious deficiencies in infrastructure with its road, rail, power and air links classed by observers as among the very worst in Asia.[1]

Manufacturing output in 2001 was roughly 40 per cent of its value in 1990.[2] Since then there has been a modest recovery in manufacturing but the sector accounts for only a very small share of total activity, currently less than 5 per cent of GDP. Table 1 gives growth rates for manufacturing and its share in GDP at constant prices over the period 1996-2008. Annual figures are erratic with the initial revival of activity in 2001-02 driven by the substantial expansion of clothing exports after the United States of America granted Mongolia full most favoured nation (MFN) treatment in 1999. Foreign investors (principally from China, Hong Kong Special Administration Region of China, Taiwan Province of China and the Republic of Korea) dominated the industry, establishing production facilities as a means of avoiding quotas in the United States. The ending of the import quota system in 2005 meant that Mongolian garments were unable to compete in the United States market and, after stabilizing in 2004, export sales fell significantly in 2005-06, so that by 2007 they were slightly below the level of ten years earlier (UNDP, 2008: 96-99). This slowdown, and then slump, in the garment sector was the major factor behind the 20 per cent decline in manufacturing in 2005.

[1] McCawley (2010). Table 3 shows the ranking of countries in Asia based on expert judgements on the quality of infrastructure. Mongolia comes bottom out of 21 countries in the overall index.

[2] This is derived from the statistics on manufacturing growth at constant prices in UNIDO (2002), Table 2.1. An average annual rate of decline of manufacturing value-added of 9.7 per cent over the 1990s is given for Mongolia in the *World Development Indicators* (World Bank 2007b, Appendix Table 4.1).

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Table 1. Manufacturing growth and GDP share, 1996-2008

Year	Manufacturing growth at constant prices %	GDP growth at constant prices %	Manufacturing share in GDP %
1996	-14.6	2.3	8.4
1997	-13.8	4.0	6.9
1998	3.5	3.5	6.9
1999	-3.0	3.2	6.5
2000	-3.2	1.1	6.2
2001	33.0	9.4	8.2
2002	18.8	3.8	9.4
2003	n.a.	n.a.	5.6
2004	-3.7	10.6	4.9
2005	-19.4	7.2	3.7
2006	13.3	8.6	3.8
2007	28.8	10.2	4.5
2008	4.5	8.8	4.3

Note: n. a. is not available since the constant price series changes in 2003 and the values for 2002 and 2003 are not in comparable prices.

Source: National Statistics Office (NSO) Yearbook of Statistics and ADB website (www.adb.org), Mongolia section.

Since 1990 there has been a considerable fall in the share in manufacturing of the consumer goods sub-sectors of garments, leather and footwear and in the capital- and scale-intensive activities of chemicals and non-metallic minerals. The result has been a concentration on a limited range of manufactures, principally textiles, food products and basic metals, which together represented nearly 80 per cent of all manufacturing in 2008 (see Table 2). These industries draw on the natural resources of the economy such as livestock, wool and ore-based metal processing. The vast majority of manufacturing (97.5 per cent of value added in 2005) has been classified as producing either resource-based or low-technology goods rather than medium- and high-technology goods.[3]

Mongolia has plentiful endowments of minerals, and there are ambitious plans to expand the exploitation of these deposits. In the late 1990s mining represented around 12 per cent of GDP, but growing mining activity, combined with higher commodity prices, has meant that it has become an increasingly important activity, accounting for between 60 and 70 per cent of industrial output and between 18 and 21 per cent of GDP in the period 2005-2008. Minerals have also come to dominate exports, with mineral products accounting for 67 per cent of export value in 2007 and 60 per cent in 2008 (NSO, 2009). The key policy challenge for Mongolia is to use its mineral revenues to revitalize and modernize manufacturing and to diversify the economy more generally to allow it to reach a more stable growth path.

[3] See UNIDO (2009) Annex 11, Table1. This source gives the classification used by ISIC category.

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Table 2. Composition of manufacturing in 2008 (at 2005 constant prices)

Category	Millions of tog	% composition
Food and beverages	186,476	32.4
Tobacco	23,444	4.1
Textiles	130,034	22.6
Wearing apparel	17,355	3.0
Publishing and printing	13,599	2.4
Chemicals	6,036	1.0
Non-metallic minerals	27,586	4.8
Basic metals	135,739	23.6
Transport equipment	16,447	2.9
Others	18,316	3.2
Total	**575,032**	**100**

Source: National Statistics Office (NSO) Yearbook of Statistics 2009.

Table 3 summarizes employment data by the aggregate categories of agriculture, industry and others, with the industry category covering mining, manufacturing and utilities. Total industrial employment in 2008 at around 124,000 was 12 per cent of the employed workforce and is still below the 1990 level, although it has been growing at around 4 per cent annually since 2000. The implied employment elasticity with respect to output of 0.19 is relatively low by international standards and reflects the dominance of mining, which is a relatively capital-intensive activity within the industrial sector. Employment data are particularly unreliable in much of Asia but this elasticity for industry is lower than reported for all but one other Asian economy in a recent comparative study (Felipe et al., 2007: Table 2).

Within industry, employment in manufacturing is estimated at around 41,000 in 2007, which is a modest increase over the figure of 38,000 for 2000, but nonetheless still only equal to the 1992 employment level. Within manufacturing, the main employers are garments (approximately 10,000 workers in 2007), food and beverages (also around 10,000 workers) and textiles (around 5,000 workers). While the garments industry is still an important employer, in 2007 its workforce was well below the peak of nearly 17,000 in 2003, as a result of the decline in clothing exports stemming from the ending of the MFA quota system.

Table 3. Mongolia's employment structure

Sector	1990	1995	2000	2008	Annual growth (%) 2000-08
	Thousand persons				
Agriculture	258.8	354.2	393.5	377.6	-0.5
Industry	131.6	108.1	91	124.1	3.9
Others	393.2	305.3	324.5	540.0	6.6
	Distribution (% of total)				**Employment elasticity**
Agriculture	0.33	0.46	0.48	0.36	-0.04
Industry	0.17	0.14	0.11	0.12	0.19
Others	0.50	0.40	0.40	0.52	0.37

Notes: Annual growth is a logarithmic growth rate. Employment elasticity is employment growth divided by growth of sector.

Source: Asian Development Bank (www.adb.org), Mongolia section.

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2.2 The Dynamics of the Manufacturing Sector

The declining share of manufacturing in GDP in Mongolia is cause for concern because there is a significant body of theory, backed up by empirical evidence, which suggests that different sectors have different growth effects and that at relatively low levels of income in particular the absolute and relative growth of manufacturing can have a key role in overall economic development.

The case for manufacturing as an 'engine of growth' is based on its capacity to generate productivity growth, technical change and externalities operating through the links between independent firms. Different mechanisms have been stressed by different authors but central is the view that, unlike other sectors, manufacturing generates 'dynamic increasing returns'; that is raising productivity through the expansion of production, through learning and through increased specialization. In this process increasing returns are the result both of the cumulative expansion of production and of interaction between activities, and are not simply confined to conventional economies of scale within activities. This dynamic process is in contrast to agriculture and services, where productivity growth arises through labour-saving technical change and the movement of workers off the land and to parts of the services sector, where productivity responds passively to expansion in other sectors.[4] Early development theory underestimated the potential for new branches of services (particularly those linked with computer-based technology) to generate sustained productivity growth and behave in the same way as manufacturing. Such dynamic services are, however, rarely significant in a low-income context.

Innovation and the resulting technical change play a critical role in economic growth, and whilst manufacturing may not be the only activity where they occur, when they are more prevalent in manufacturing, this provides a justification for its special place in planning for growth.[5] If increasing returns and externalities are the rationale for intervention, logically this implies selectivity in support, since the scope for these effects will vary both between branches and between firms within branches. These theoretical arguments on the special role for manufacturing are supported empirically by the following broad generalizations (Rodrik, 2006):

i) As countries grow up to a threshold income level the share of manufacturing in GDP rises.

The generalization that up to certain point the share of manufacturing in national income rises as income per capita grows up is well-established and has been re-confirmed in recent analyses (UNIDO, 2009; ADB, 2007). If one plots the relationship, it is best represented as a U shaped curve with the share of manufacturing rising at an increasing rate at relatively low income levels (as in the newly industrializing countries –the NICs), stabilizing at some point and then declining beyond that. The strength of the initial impulse comes from a move out of agriculture into higher productivity activities, of which manufacturing is the key. Workers also move out of agriculture into services, and the service sector's share in GDP also increases. Two economic factors will drive this process. On the demand side it is well-established that the share of income spent on food declines as income rises, whilst the expenditure share on manufactures rises with income. However, as income passes a threshold level, the expenditure share of manufactures stabilizes and then starts to decline. The second factor influencing this process of successive sectoral shifts is differential productivity growth. Historically there is strong evidence that growth of labour productivity in manufacturing is more rapid than in

[4] This analysis stems from the influential work of Nicholas Kaldor in the 1960s. Various surveys and summaries are available. See, for example, Weiss (2002) Chapter 4.

[5] The 'self discovery' model of Hausmann and Rodrik (2003) sets out the case for subsidising innovative and risk-taking activity in the introduction of new products and technologies as all potential followers gain from the actions of innovators.

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agriculture or in services, although there is some evidence that newer computer-based service activities are also seeing rapid increases in productivity.[6] Faster productivity growth means that the price of manufactures relative to services declines, boosting the initial demand shift towards manufactures. At a later stage this favourable relative price shift creates a substitution effect in favour of manufactures, which partly offsets the effect of a declining income elasticity of demand for manufactures.

ii) Up to a threshold income per capita, fast growth of GDP is associated with a large manufacturing share.

Manufacturing is not the only sector whose share is correlated with GDP growth but for the theoretical reasons noted above the impact of its size on growth tends to be greater than for services (Szirmai, 2009; Dasgupta and Singh, 2006). Furthermore, analyses of periods of rapid growth ('growth accelerations') suggest that rapid growth tends to be either accompanied or preceded by a structural shift in either output or employment towards manufacturing. An analysis for developing Asia finds that for periods of 'rapid growth' (defined as more than three consecutive period averages of growth in GDP of at least 5 per cent) there is a statistically significant tendency for these to be associated with a rising manufacturing share, but no similar conclusion is reached for services. This is in part because a rise in services share can also be associated with a growth deceleration as workers displaced elsewhere are absorbed in services activity with lower productivity (ADB, 2007: 297- 303).

It should be noted, however, that some new service activities are showing signs of dynamism similar to that of manufacturing. Whilst some service activities in developing countries, such as retail and wholesale trade and public bureaucracies, have low productivity, new dynamic elements of services are emerging, such as business and computer-based services, telecommunications and tourism. In some countries (e.g. India) these latter dynamic elements are starting to dominate and the services sector as a whole is behaving in a way similar to manufacturing and thus offering higher-productivity employment than that available in agriculture. It appears that booms and busts in mining can also be responsible for faster and slower growth in mineral-dependent countries.

iii) Economies that have higher value exports based on manufactures tend to have both higher export and GDP growth.

The historical and contemporary evidence shows that *what* a country exports matters for growth. Recent work by Hausmann, Hwang and Rodrik (2006) attempts to quantify the diversification of the export basket of individual countries by constructing commodity indices of technological or product sophistication (see Box 1). This is done by using a weighted average of the income of the exporters of a good to the world market, which is called PRODY (at either the 4- or 6-digit level). The PRODYs are then aggregated into a single export index for each country which is called EXPY (a higher EXPY implies a higher value-added composition of exports). This becomes one of the explanatory variables in a model to explain growth. The result is that for lower and middle income economies (but not higher income countries) there is a significant positive relation between the EXPY index at the start of a period and subsequent growth, controlling for other influences. The impact of EXPY on growth varies with the form of estimation, but it is in the range of 0.3 to 0.8 percentage points of extra GDP growth for every 10 per cent increase in the index. The result is confirmed in a separate analysis for developing Asia using the same approach (see Box 2). Exporting high-value goods is thus good for growth, and since most high-value products are manufactures, this measure provides a new link between export composition and growth. It is picking up the high income elasticity of demand of high

[6]For example, in the OECD countries, between 1971 and 1994, the growth of labour productivity in manufacturing (at 3% annually) was nearly three times that of productivity growth in services (at 1.1%) (Rowthorn and Ramaswamy (1997, Table 1).

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value-added products. Rodrik (2006) looks specifically at the case of China, whose EXPY is well above that predicted for its income level and which appears to explain at least part of China's high growth rate.

Box 1. PRODY and EXPY methodology

The structure of production and structure of exports matters for the growth of output and exports. One way of showing this, pioneered by Hausmann, Hwang and Rodrik (2006) is to calculate the EXPY for each country based on whether countries are specializing in 'high income' goods or 'low income' goods – and then to relate EXPY, GDP growth and export growth across countries.

$$\text{PRODY}_k = \sum_j \text{Y}_j * \frac{(x_{kj} / X_j)}{\sum (x_{kj} / X_j)}$$

where:
Y_j is the per capita GDP of country j
x_{kj} denotes exports of country j of product k
X_j denotes total exports of country j

$$\text{EXPY}_\text{j} = \sum_k \text{PRODY}_k * \frac{x_{kj}}{X_j}$$

where:
x_{kj} denotes exports of product k of country j
X_j denotes total exports of country j

Some developing countries such as China have an EXPY higher than would be expected on the basis of their level of per capita income, indicating they are producing and exporting types of (manufactured) goods more associated with higher income countries.

A relationship between EXPY and export growth reflects the higher income elasticity of demand for higher value-added products.

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Box 2. Export sophistication and economic growth

The simplest version of the model of Hausmann *et al*. (2006) makes growth over a specific time period (g) a function of the starting level of GDP per capita (Y), the starting level of export sophistication as measured by the EXPY index and the changing share of industry in national income over the period (dM).

$g = a + b_1 Y + b_2 EXPY + b_3 dM$

The expectation is that other things held constant growth will be slower the higher is initial GDP per capita (so b_1 is negative). The rising share of industry in GDP is expected to be positively associated with growth up to a threshold income level. The test is whether the type of goods a country exports at the start of the period is associated with subsequent growth (so b_2 is expected to be positive).

This analysis is conducted for 23 countries in developing Asia over the period 1977-2004 both on a cross sectional basis over the whole period and using five year averages in an unbalanced panel analysis. The results given below confirm the Hausmann *et al*. (2006) conclusions.

Cross section n = 23

$g = -0.011\ Y + 0.056\ EXPY + 0.001\ M \qquad R^2 = 0.35$

(1.89)* (2.85)** (0.50)

Five year panel n = 61

$g = -0.005Y + 0.032\ EXPY + 0.007M \qquad R^2 = 0.30$

(-2.48)** (5.01)*** (5.43)***

The coefficient on EXPY is positive and significant and implies that a 10% increase in the sophistication score means that growth over the period is raised by between 0.3 and 0.6 percentage points, as compared to 0.3 and 0.8 in the analysis of Hausmann *et al.* (2006).

Notes: The variables g, Y and EXPY are in logarithms; t ratios are in brackets; *** significant at 1%; ** significant at 5%; and, * significant at 10%.

Source: ADB (2007: 295).

If manufacturing has a role in growth, what can be said about the sector in Mongolia? Has it become too small relative to the rest of the economy? One way of addressing this question is to benchmark Mongolia against countries of similar income level and other characteristics and to consider whether the size of the sector is higher or lower than expected for a country at that income level and with those characteristics. Box 3 describes this exercise, the result of which suggests that manufacturing in Mongolia is indeed smaller than expected.

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Box 3. Mongolia and cross-country patterns for manufacturing

To examine how Mongolia's economic structure differs from what would be expected the analysis uses a simple cross-country regression model that makes the manufacturing share in GDP (M) a function of income per capita (Y), population (P) and a dummy variable for whether or not a country is a significant mineral exporter (D). The form of the equation is:

$$M = a + b_1Y + b_2Y^2 + b_3P + b_4D \qquad (1)$$

Different income measures both unadjusted and purchasing power parity values are tried with very similar results. Data relate to 2005-06 and the model is run for 94 countries at different income levels. Following the index developed by Davis (1995) the dummy D takes a value of 1 for economies identified as mineral-dependent (plus Mongolia as a recent large scale mineral exporter) and a zero for all others. The squared income term is introduced to allow for the S-shaped relation where the manufacturing share declines beyond a certain income level. Thus whilst the coefficient b_1 is expected to be positive, b_2 is expected to be negative. Other things being equal, a large domestic market, as reflected by population size, will be expected to increase manufacturing share (b_3 is expected to be positive). However, mineral exporters, other things being equal, will be expected to have a smaller manufacturing share (b_4 is expected to be negative).

Data come from UNIDO (2009) for manufacturing share, and the *World Development Indicators* for population and income data. The result when (1) is estimated in logarithmic form is given below with all variables strongly significant and with the expected signs. Manufacturing share in GDP rises with income up to a threshold and then declines. A larger population is associated with a larger manufacturing share and mineral-dependent economies have a smaller manufacturing share.

$$M = -6.06 + 1.88\ \ln Y - 0.99\ \ln Y^2 + 0.06\ \ln P - 0.36\ D$$
$$(-2.96)^*\quad (2.82)^*\quad (-3.64)^*\quad (2.32)^{**}\quad (-3.55)^* \qquad \text{Adjusted } R^2 = 0.31;\ N = 94$$

Putting the income and population values for Mongolia into this equation predicts a manufacturing share in GDP of 9.6%, which is more than double the actual share for 2008 (see Table 1).

In addition to a lower than predicted manufacturing share in GDP, Mongolia also has a lower than predicted export sophistication. EXPY can be related to GDP with the expectation that as countries get richer their export basket gets more sophisticated in terms of higher-value products. Mineral-exporting countries may behave differently and this needs to be controlled. A simple regression is run across 94 countries for which data are available where

$$EXPY = a + b_1Y + D \qquad (2)$$

where, as before, Y is GDP per capita and D is the mineral dependent-economy dummy.
The result of equation (2) is:

$$EXPY = 9{,}472 + 0.21Y + 426D$$
$$(22.73)^*\quad (10.35)^*\quad (0.64) \qquad \text{Adjusted } R^2 = 0.54;\ N = 94$$

If the income value for Mongolia in 2006 is applied to this equation, it gives an expected EXPY of US$10,547. This can be compared with the actual EXPY in 2006 of US$7,302. Thus the actual level is approximately 70 per cent of that predicted.

Note: t-ratios in brackets, * significant at 1 per cent level, ** significant at 5 per cent level.
Source: Weiss (2010).

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2.3 The Role of Government in Supporting Manufacturing Industry

Industrial policy takes the form of policy interventions designed to affect the allocation of resources in favour of industry (principally manufacturing) as distinct from other sectors. Such interventions may also affect resource allocation within industry in favour of particular branches or sub-sectors (so they may be 'selective' rather than 'functional'). Interventions can involve either the price mechanism or direct controls and be focused on exports as well as the domestic market. Industrial policy in this definition is thus much wider than the import substitution trade policies with which it is often associated. It can also be seen as a process as well as a set of interventions in which dialogue between government and the productive sector identifies the key constraints that policy needs to address.

The theoretical basis for industrial policy focuses on two propositions, one relating to the special role for manufacturing and the other to the failure of markets to produce a social optimum because of factors like externalities, lack of information, monopolization or social barriers. The early development literature contained analyses of how market failures could be overcome by government intervention: by co-ordinating investments to overcome demand constraints (the Big Push/Balanced Growth argument); by encouraging the absorption of the labour surplus in manufacturing; and by fostering learning-by-doing (through infant industry protection). In the face of widespread market failure, subsidies as compensation were treated as the most efficient (but not necessarily the most practical) solution. The rationale for interventions based on general market failure logically implies that support should be offered equally to all participants in the market ('functional' support). However, insofar as increasing returns and externalities provide the rationale for intervention, this implies selectivity in support, since the scope for these effects will vary both between sub-sectors or branches of manufacturing and between firms in branches. Given the focus on externalities, industrial policy must also have an environmental dimension to ensure appropriate standards. Tax-subsidy measures can also be applied to correct for environmental externalities. In brief, there is no shortage of arguments that can be marshalled to make a case for industrial policy.

Although there may be widespread agreement that governments have a role in industrial development beyond simply ensuring a stable macro environment and protecting property rights, there remain large differences over what is an appropriate and feasible role. This is not surprising since the challenges and governments' capacity to intervene differ between countries, and what is necessary and feasible in the context of a middle-income or newly- industrializing economy can be quite different from what is necessary and feasible in the context of a low-income economy like Mongolia.[7]

Objections relate to feasibility and the possibility of policy 'capture' by vested interests. The debate about industrial policy can be summarized by focusing on two competing perspectives. One can be characterized as a promotional approach. In this, governments are recommended to think big, and to support and promote sub-sectors. The aim is to shift fairly rapidly into new, dynamic and technologically-sophisticated activities. Some of these may be quite different from the sectors the economy is currently specializing in. Since by definition some will be new activities for the economy, firms may need financial incentives to justify the risk involved. Governments are perceived as promoters, which act as catalysts and provide the financial support needed during the learning period of the new firms and assist in the process of industrial start-up with training, export marketing and the general co-ordination of support activities. The other perspective, which can be characterized as a market-based approach, sees governments as facilitators whose role is to address the malfunctioning of

[7] The debate between Lin and Chang (Lin and Chang, 2009) illustrates some of the key differences. Lin talks of a facilitating state that supports activities with a comparative advantage and Chang of a more interventionist state that funds technological upgrading.

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markets, either to correct for externalities or to provide the information and infrastructure needed by firms. Although this role may seem to imply a more modest amount of intervention, the role of the government can be substantial when governments interpret market failure in a broad sense, for example providing credit where the financial sector is risk averse, or training where firms under-invest because of the risk of workers leaving. The facilitating government corrects for failures, leaving firms to decide how far they wish to innovate and upgrade their production.

The most recent academic interpretation of industrial policy as developed by a team at Harvard University has been applied to a number of countries and draws on both perspectives. Of the countries studied, the work on South Africa as a major mineral exporter is most directly relevant to Mongolia. In their analysis of the policy options for South Africa, Hausmann *et al*. (2008a) argue that industrial policy should work on two levels. On the micro level (what they term 'in the small'), there should be regular dialogue between the government and the private sector where bottlenecks and market failures are identified, and the government plays a co-ordinating and facilitating role to remove them. On the second level ('in the large') a more ambitious role is identified for government, providing funds in the form of risk capital for innovative ventures through a Public Venture Capital Fund or a Development Bank. The aim is to support risk–taking activities that are genuinely new to a country and represent a major shift away from current specialization. The rationale for public support is that risk-takers who innovate open a path for others to follow and thus offer a form of external benefit for which they are not compensated. Thus, in the absence of public support, there will be too little risk-taking and innovation. Since a lack of funds for new activities can be interpreted as credit-market failure, this is compatible with the market-based perspective. However, aspects of the recommendations contained in Hausmann *et al*. suggest elements of a promotional approach where the government may wish to select a priority area and then look for and support private investors in its development. Since the support that can be offered will be limited, either explicitly or implicitly, governments will in practice be favouring some areas over others.[8]

What sort of intervention is likely to be implied by the different versions of industrial policy under the broad definition used here? *The objective of industrial policy is to increase incentives for industry and to raise the rate of profit there*. This can be achieved in a variety of ways aimed at addressing particular problems. Table 4 sets out a simple taxonomy distinguishing between the 'market-based' and 'promotional' approaches, where the former aim to correct for market failures as they affect existing activities and the latter to promote or create new activities with the potential for productivity growth and externalities (or to restructure activities with potential). 'Functional' means widely available as opposed to 'selective', which refers to favoured activities or firms.

[8] Hausmann and Rodrik (2006) describe this dilemma dramatically as being 'doomed to choose'.

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Table 4. Industrial policy taxonomy

Market-based measures	Coverage	Rationale
Research and Development tax credits	Functional	Technology spill-overs and risk-taking externalities
State industrial research and education	Functional	Creation of national technological capability
Labour training subsidy	Functional	Labour training externality
State venture-capital funds	Selective	Risk-taking externality
State export-promotion agency	Functional	Lack of information and provision of a public good
Infrastructure provision for Special Economic Zones	Functional	Encouragement of clustering and agglomeration effects
Profits tax holidays	Functional	Encouragement of manufacturing investment
Undervaluation of exchange rate	Functional	Encouragement of internationally-traded activities, including manufacturing
Promotional measures	**Coverage**	**Rationale**
Temporary financial assistance	Selective	Funding to allow restructuring of uncompetitive activities
Temporary import tariff protection	Selective	Protection of uncompetitive activities requiring restructuring
State procurement policy	Selective	Priority in access to public-sector contracts
Export subsidy	Selective	Differential rates of subsidy based on productivity potential
Import tariffs	Selective	Differential rates of protection based on productivity potential
Directed credit	Selective	Priority allocation of credit based on productivity potential
Profits tax holidays (selective)	Selective	Favourable tax treatment for foreign investors
Incentive packages of tax, loans and infrastructure	Selective	Favourable treatment for foreign investors

Source: Weiss (2010, Table 4).

Each measure has its advantages and disadvantages. Government expenditure on infrastructure provision, for example, may lower production and transport costs and boost the incentive to invest in industry. However, it has to be financed, and thus places strong demands on fiscal policy. Tax concessions of various types do not involve direct expenditure, but only benefit firms after investment decisions have been made. The availability of credit will be important to investors where the commercial banking system is not playing its financial intermediation role effectively, but where domestic savings are insufficient, external funds will have to be found. How far credit should be available at a concessional or subsidized interest rate is highly controversial. Low-interest loans raise the incentive to invest, but run the risk of encouraging low-return activities, since investors do not need to cover the opportunity cost of the funds. In addition, such loans may, if used widely, shift the choice of technology in a capital-intensive, labour-saving direction. Import protection has the great attraction of not requiring additional revenue, since support for investors is provided by domestic consumers of the protected goods, and also raises tax revenue.

International experience, and particularly the experience of East Asia, suggests that the precise mix of instruments used is less important than *the pursuit of several broad principles* to ensure that these lead to genuine industrial development as opposed to simply increasing the profits of the recipients (Weiss, 2005). These can be summarized as follows:

- A regular dialogue with the private sector;

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- Clear performance criteria should be established so the success or otherwise of an intervention can be judged; and it should be made clear where government support is being directed. Support should be time-limited, not open-ended, so recipients have an incentive to improve efficiency by the end of the period specified;

- As far as possible support should be provided for broad activities (such as R and D or labour training) or sectors (like electronics) rather than to individual firms, to avoid distorting competition and establishing monopolies[9];

- Exporting should be encouraged as a means of introducing competition and opening a sector to foreign technology and to earn foreign exchange.

2.4 Industrial Policy in Mongolia

For the reasons highlighted earlier, Mongolia is under-industrialized. Economic diversification that allows the manufacturing sector to play a more significant role should be an important policy objective. As to how this might be achieved, there are three broad options, not mutually exclusive.

- Development of the mineral sector;

- Modernization of traditional activities; and

- Development of new activities.

How far these are viable options will depend not so much on financial resources, since rising mineral revenues will be expected to provide significant funding for diversification, as on the skill level, infrastructure and institutional basis of the country, which will determine its absorptive capacity. Government policy clearly has a role to play in increasing absorptive capacity. Various aspects of policy are discussed below.

Mongolia is currently operating an export-oriented industrialization strategy in the context of an open trade regime. Given the small size of the domestic market, evidence that one of the prerequisites of success with such a strategy is that producers should access imported inputs at international prices, and the existence of significant natural protection from the landlocked nature of the economy, it is unlikely that low uniform protection has seriously undermined domestic manufacturing. Moreover, an open trading regime is compatible with various forms of support for domestic producers with the qualification that such support is not 'trade-distorting', so that it does not involve one of the various forms of export subsidy or minimum local content targets. Examples of such support include the provision of finance to industry or tax holidays for industrial investment, where firms themselves are allowed to determine whether and how much of their production is exported and how much they purchase from domestic suppliers.

[9] There is some dispute as to whether sector targeting is sensible, with some preferring to stress support to activities that generate externalities and may span several sectors; see Hausmann and Rodrik (2005: 79).

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The current formal policy for industry of the Government of Mongolia, as set out in the *Millennium Development Goals-Based Comprehensive National Development Strategy of Mongolia*, was approved in February 2008. This document contains highly ambitious annual growth targets for GDP of 14 per cent over 2008-15 and of 12 per cent annually from 2016-2021, to allow the economy to achieve middle-income status by the end of the period. These figures are high even by the standards of the recent past when mineral prices were very favourable. Even allowing for the development of the many mineral projects planned over this period, such rapid growth is almost certainly unattainable, since even with the revival of favourable commodity prices, the absorptive capacity of the economy would be limited by factors such as lack of skilled personnel and infrastructure capacity.

The core of this strategy is to use mineral wealth to generate resources to allow the diversification of the economy. It is clear that the government is well-aware of the industrial policy options available to it, and the strategy document identifies many of the policy interventions set out in Table 4.

Table 5. Mongolia Millennium Development Goals-Based Comprehensive National Development Strategy: key industrial policy interventions

Objective	Mechanisms	Instruments
Develop the mineral sector	Exploit mineral deposits and encourage processing to add value (p. 27)	Negotiated contracts with foreign investors based on length of lease, royalty and tax rates; develop supplier firms for mining sector (p. 29)
Modernize manufacturing	Introduce new technologies in traditional sectors	Incentive packages for domestic and foreign investors; Free Economic Zones (p. 25); training programmes to upgrade skills (p. 25); develop ICT (p. 39)
Develop national technologies	Support a national innovation system (p. 17)	Tax incentives for R and D (p. 25); Finance through Mongolia Development Fund (p. 17); Public National Research Centres (p. 17)
Manage foreign trade	Diversify exports with 'selected import substitution' (p. 26)	Macro stability and competitive exchange rate (p. 23); support for SME exporters through tax policy (import duty drawbacks for exporters) (p. 30)
Increase long-term finance	Put mineral revenues in Mongolia Development Fund (p. 21)	State-owned Development Bank (p.23); reduced interest rates for on-lent foreign funds for SMEs (p. 24)
Improve investment climate	Support the private sector and improve infrastructure	Regular dialogue with private-sector organisations (p. 26); efficient public services, strengthen legal system (p. 27); develop road and rail networks (pp. 35-36)

Source: Government of Mongolia (2008b).

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The government sees its role as creating a favourable business environment, ensuring a sound and reliable financial system and reducing bureaucratic obstacles to doing business. Among its key priorities is the development of an export-oriented, private-sector-led, high-technology-driven manufacturing sector funded in part out of the proceeds of mineral exploitation (through a Mongolia Development Fund). Table 5 summarizes the key objectives, the mechanisms to reach them, and the policy instruments referred to in the Millennium Development Goals-Based Comprehensive National Development Strategy as they relate to industry. This is a comprehensive list and clearly indicates that most conventional policy measures are already under discussion in Mongolia. Specifically, key concerns highlighted in recent reports on industrial development in Mongolia, such as a lack of long-term finance, high trade and transport costs, and a deficient investment climate, are all referred to here.

An important aspect of the process side of industrial policy as highlighted in the recent academic literature relates to government intervention to overcome the malfunctioning of markets because of lack of information and any divergence between private and social returns. Where markets do not give the right signals it is necessary for governments to intervene to co-ordinate the responses of market participants to try to ensure that bottlenecks are overcome. Another aspect of co-ordination failure relates to the inability to control the impact of productive activity on the environment. The National Development Strategy has among its strategic objectives a 'proper use of land and mineral resources' (p. 44) and in particular the establishment of a system of economic charging for environmental damage from mining (p. 28). An effective environmental dimension to industrial policy requires rigorous environmental impact assessment studies of new large-scale mines, the effective implementation of existing laws and controls, and their extension to the informal sector.

2.4.1 Long-Term Finance

The World Bank (2007a: 14) concluded that poor financial intermediation was the key factor in keeping the cost of capital high in Mongolia. Poor corporate governance and lack of transparency in business operations are said to have made it difficult for banks to assess credit risk and forced them to rely on collateral-based lending with high risk-premiums, particularly for SMEs. Of the total credit to the private sector available in the first half of 2008, less than 10 per cent was for loans of over four years, with over 40 per cent for less than one year. Even this relatively low share of long-term financing is still a significant improvement over just a few years ago. In 2005 the share of loans of over four years was just 4 per cent (ADB, 2009: 33).

Table 6. Mongolia: interest rates (%)

Year	Local currency short-term borrowing	Foreign currency short-term borrowing	Maximum spread local currency[a]	Inflation
2001	41.4	22.2	39.0	8.0
2002	33.4	19.8	27.4	1.6
2003	31.5	19.6	25.5	4.7
2004	30.0	17.9	24.0	11.0
2005	28.3	14.8	22.3	9.5
2006	24.5	15.5	16.9	6.0
2007	19.9	14.2	12.3	15.1
2008[b]	20.8	13.8	18.4	17.9

Note: [a] Maximum difference lending minus deposit rate; [b] First quarter only.

Source: Bank of Mongolia cited in ADB (2009: Table 1.5).

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Interest rates in Mongolia are high by international standards and competitor governments provide credit at lower rates (and sometimes grants) to their producers; for example, through modernization programmes for leather goods in India and cashmere in China (ADB, 2009: 28). Table 6 gives annual average rates for local and foreign currency borrowing and the average lending-deposit rate spread. Until 2006 real rates were very high for local currency funding, although since then they have been reduced by inflation.

The underlying cause of the high cost of borrowing in Mongolia has been put down to a combination of high deposit rates, high bank operating costs and reserve ratios, and high risk premiums (World Bank, 2007a:14). Insofar as these underlying factors remain unchanged, high real rates may reappear in a low inflation environment. Hence the Strategy document is correct in its focus on financial sector regulation and reform as the best way of bringing down the cost of funds through reducing bank risk (p. 24).

In the face of this credit shortage and a weak commercial banking sector the proposal to establish a national state-run Development Bank to provide long-run finance for industry is understandable. State-owned Development Banks have gone out of fashion in recent years with many advising that a preferable option is the development of a commercial banking sector that can provide long-run finance on a more efficient basis. However, this option appears a long way off in Mongolia at the present time, and, as discussed elsewhere in this report, the creation of a Development Bank is one of the mechanisms recommended to mineral exporting economies to fund economic diversification. A state-run Venture Capital Fund has also been discussed for Mongolia, but given the undeveloped nature of the stock market at present, such a Fund is likely to be premature.

The case against Development Banks is that by attempting to combine commercial, economic and social objectives they can fund unviable projects which squander national resources. To avoid such risks clear criteria need to be established before projects are accepted. These must focus on the demonstrated potential net benefits to the economy from the projects concerned, as well as their financial viability. Techniques for assessing both the economic and financial returns of projects are readily available and have been applied by international development agencies for many years (ADB, 1997).[10] To avoid the risk of multiple objectives confusing decision-taking, it is preferable not to incorporate employment generation or distributional change as criteria for project acceptance under Development Bank funding, leaving other policy instruments (such as labour training or social sector expenditure) to address these important considerations directly.

International development agencies require the productive sector projects that they fund to be economically viable, so they generate an economic return at least as great as one that could be generated by alternative use of the funds, whilst in addition normally being financially viable. This latter condition means that funds are lent to the project at their full cost and not at a subsidized interest rate.[11] There has been much debate about high levels of interest rates in Mongolia (they were nearly 2 per cent per month for short-term credit in early 2010) with (as has been seen) such rates reflecting a combination of high administrative costs and risk premiums. For relatively small projects a Development Bank should be able to spread risk and if run efficiently should be able to offer funds at a considerably lower interest rate than that prevailing in commercial banks at present. International experience suggests that the enforcement of commercial standards in the working of Development

[10] Textbooks such as Curry and Weiss (2000), Potts (2002) and Thirlwall (2006) make clear the distinction between economic and financial effects.

[11] This can be done by discounting financial returns at a weighted cost of capital discount rate, for example, with the varying cost of funds from different sources incorporated in the calculation.

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Banks is important both to minimize non-performing loans and reduce the misuse of development funds. It should be noted, however, that the practice suggested here of basing the cost of capital on international risk-free rates (as the definition of the opportunity cost of the funds) is an implicit subsidy, where commercial bank funds (if available at all) would be at a higher risk-adjusted rate (see Box 4).

Box 4. Cost of credit in on-lending operations

Where public funds – available from the general budget or from external sources – are provided to a Development Bank or to institutions to support SMEs or to provide micro loans, there is always the question of whether such funds should be provided on concessional terms. An interest rate subsidy is any difference between the borrowing rate charged and a full commercial rate. A commercial interest rate can be derived from a mark-up over the cost of funds to the government where the latter are specified as either the foreign borrowing cost (LIBOR plus the country margin) or the return on risk-free foreign assets (such as US Treasury Bills) where the funds would otherwise have been invested abroad. Hence:

idom = ifor + c + fer + credr

where idom is a domestic commercial interest rate; ifor is the foreign cost of funds to the government; c is the commission fee or margin to cover the administrative costs of the intermediary institution; fer is a mark-up to cover the foreign exchange risk where the funds are on-lent in domestic currency; credr is a mark-up to cover the specific borrower credit risk.

In situations such as in Mongolia today credr may be perceived as high, contributing to the high interest rates. If the government wishes to promote new activities it can provide Development Bank funding at interest rates that cover the sum of ifor, c and fer but ignore credr. Where loans are only offered for innovatory activity, this is equivalent to the subsidy for innovation recommended in the academic literature referred to above. However, this is only a partial subsidy since the opportunity cost of the funds will still be covered. Ex ante perceptions of risk are uncertain of their nature, and if a high risk component credr accurately reflects probability of default, a low interest rate policy may put the financial viability of a Development Bank in question. However, against this Development Banks can take risks as part of their mandate and since their goal is overall economic impact, a small number of successful ventures funded by such a Bank can readily offset losses on high-risk borrowers who cannot repay. If the Development Bank can operate such a policy successfully, it will have the added benefit of signalling to commercial banks that long-run credits for new activities can be repaid and need not entail very high interest charges to cover risk.

The case for an interest-rate subsidy to support SMEs needs to be considered carefully. Recent discussion of industrial policy stresses support for innovatory activities, rather than simply for particular sectors or firms of a particular size.[12] Where public support for SMEs is involved there may be a case, as with Development Bank lending, for offering funds at a rate of interest based on the international rate for risk-free assets. This will be above the cost of concessional finance to the country and thus when funds are repaid at this rate they will generate a surplus for relending, but will be well below existing commercial rates.

[12] Hausmann and Rodrik (2005:79) for example argue against support on the basis of size, arguing instead that the key is to support activities that 'have the potential to spawn new areas of specialisation'.

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However, if large amounts of funds were to be channelled in this way, there is the risk that this would block the entry of the commercial banks into the SME segment of the market. An alternative approach, which has been applied in many countries to reduce the risks from SME lending, is for the government not to lend itself, but to offer intermediary institutions credit guarantees for SME borrowing. This can be important in a financial market such as that in Mongolia where banks and other financial institutions have little experience of SME lending and little credit information on potential borrowers. Guarantee schemes can thus help to 'kick-start' SME lending and allow the build-up of experience which will reduce the overhead cost per dollar lent.[13] Such schemes typically guarantee up to 80 per cent of loans.

2.4.2 Foreign Trade and Transport Costs

Foreign trade in Mongolia operates in an open trading environment with low uniform import tariffs. The transport, communication, administrative and time costs involved in international trade are currently a more significant barrier. Whilst import tariffs are uniform at 5 per cent, transport costs alone are estimated to have averaged 18 per cent of the world price for exports and 10 per cent for imports in 2006 (UNDP, 2008: 115). Selective tariff protection to support nascent activities is possible under WTO rules and such a proposal was made by the Customs Tariff Council in 2006 but not followed up (UNDP, 2008: 87). When the Strategy document refers to import substitution in foods and consumer goods (p. 26), it does so without reference to tariff protection, with the implication that any such import replacement will occur through the growing competitiveness of domestic firms rather than being accelerated by tariff protection. Local firms already enjoy an element of natural protection associated with distance and the landlocked nature of the economy. Further, where transport costs are higher on final outputs than inputs, effective protection from this source (that is protection of value-added) will be higher than nominal protection (protection on output).

This report does not have sufficient data to calculate the effective protection created by trade costs at the sub-sector or product level. However, as a rough indicator, the 2005 input-output table suggests an average value-added content in the output value of manufacturing of around 30 per cent.[14] This low figure is the result of the import- intensive nature of much of the sector. If this figure is combined with a uniform nominal tariff of 5 per cent and a transport cost of 10 per cent, the protection on value added for domestic sales will be 15.5 per cent. However, high transport costs, whilst offering protection for domestic sales, pose a serious barrier to exports, both in terms of a reduction in net revenue for a given world price and in delays. The latter are currently a particular concern for perishables and would be more so in the future were Mongolia to start exporting products required as inputs in a global production network organized on a just-in-time basis. In a simple numerical example the introduction of an average rate of transport cost of 18 per cent for exports is equivalent to a high export tax and generates a negative effective protection of -96 per cent; in other words value-added is virtually zero. Other assumptions give less extreme results but value-added in exporting is always considerably lower than what it would be in the absence of transport costs (see Box 5).

[13] Experience with credit guarantee schemes for SMEs is surveyed in World Bank (2007c), Chapter 4. The German aid agency, GTZ, already supports a number of credit guarantee schemes for small enterprise in Mongolia.

[14] The table is from the NSO Yearbook 2009 electronic version.

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Box 5. Protection due to transport costs

The standard effective protection formula can be modified to account for trade costs (including transport cost). Where i is an importable good and ∑j represents all purchased inputs j, value added per unit of i is 1-∑aji, where aji is the value of inputs of j required per unit of i. Import tariffs t and transport cost tr, defined as a proportion of the world price, will combine to raise domestic prices above prices in a trading partner. The formula for effective protection (ERP), or the proportionate increase in value-added due to tariffs and transport costs, for an importable product sold in the domestic market, but which would otherwise have been supplied by imports from the trading partner is:

$$ERPi = [((1+ti)(1+tri) - \sum aji\,(1+tj)(1+trj))/(1-\sum aji)] - 1 \qquad (1)$$

Where it is assumed tariffs are applied to the cif price at the border including the international transport cost from the supplier economy and where all inputs are also importable.

Since the value added coefficient (1- ∑aji) is in the denominator, other things being equal, ERP rises as the share of value-added in output falls. It also rises more the greater is ti or tri relative to tj or trj or in other words the greater the protection on output relative to that on inputs.

The treatment of exportable goods is different, however, since unless an export subsidy is given sales will be at the cif price at the border in the partner country minus the transport cost incurred in moving the good there. Where inputs are importable, unless an exemption or drawback scheme is in place, import tariffs and trade costs will still raise prices above those in the trading partner. The formula for effective protection for an exportable good e is:

$$ERPe = [((1-tre) - \sum aji\,(1+tj)(1+trj))/(1-\sum aji)] - 1 \qquad (2)$$

The orders of magnitude can be illustrated by taking the average transport cost data for imports of 10% (so tri and trj = 0.10) and for exports of 18% (tre = 0.18). Import tariffs are set at the uniform rate of 5% (so ti and tj=0.05) and the value-added coefficient is taken as the average for manufacturing of approximately 30% (so 1 - ∑aji = 0.3). Putting these values into (2) gives:

ERPi = [((1.10*1.05) – 0.70*(1.10*1.05))/(1-0.70)] - 1 = 0.155 or 15.5% protection on value-added in the production of an importable good.

For the exportable putting the values into (1) gives:

ERPe = [((1-0.18) – 0.70*(1.10*1.05))/(1-0.70)] - 1 = -0.96 or -96%

In other words, with this combination of high transport cost value added virtually disappears and is 96% less than what it would be in the absence of tariffs or transport cost. Assuming transport costs are 10%, rather than 18%, of the fob value of exports and that imported inputs can have tariffs waived or refunded gives:

ERPe = [((1-0.10) – 0.70*(1.10))/(1-0.70)] - 1 = -0.57 or -57%.

In this case value-added is now roughly half what it would be in the absence of transport costs.

Source: Weiss (2010).

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It is well-known that the transport infrastructure of Mongolia is seriously deficient and in need of modernization. The main port of export, Tianjin in China, is 1,700 km from Ulaanbaatar with high rail costs per km. Complications with different railway gauges in Mongolia, Russia and China, the age of track, rolling stock and locomotives combine to give high freight costs for goods moved by rail. Table 7 compares these costs per km for Mongolia and landlocked Central Asian Republics. In addition, lack of adequate trade facilitation facilities at the border causes further delays, and gives the opportunity for informal payments to customs officials to expedite the process. The average border crossing time is said to be around 25 hours with a maximum of 75 hours, which is well above the average for landlocked countries in East Asia (World Bank 2007a: 23). Road conditions are also poor; they restrict the diversion of many products from rail to road transport and limit the size of the domestic market.

Table 7. Comparative rail freight costs

Variable	Almaty, Kazakhstan	Tashkent, Uzbekistan	Dushanbe, Tajikistan	Bishkek, Kyrgyz Rep.	Ulaanbaatar exports	Ulaanbaatar imports
Distance to nearest port km	3,380	2,720	2,040	3,100	1,700	1,700
Cost US$/TEU/km	0.37	0.35	0.59	0.34	0.61	0.87

Note: TEU is twenty foot equivalent unit container.

Source: World Bank (2007a: Table 13).

These transport bottlenecks are fully understood and the Strategy document contains ambitious plans for projects to modernize both road and rail transport. These plans require very substantial investment, some of which may come from the Mongolia Development Fund, some from international financial institutions, with the remainder, it is hoped, coming from the private sector. Both the World Bank and the ADB are already supporting various transport projects in Mongolia, such as the ADB road project between Choir and Zamyn Ud and the Regional Altai Western Corridor project, both of which link to the border with China. Proposed new projects are to link mining sites earmarked for development with the border as well as the improvement of roads in urban areas. The cost of three large road projects included in the top priority list of the National Development and Innovation Committee for 2011-2015 alone is put at US$3.3 billion by the National Development and Innovation Committee. In addition, rail construction costs for new lines have been estimated by the World Bank at US$1.0-1.2 million per km, rising to US$2 million for difficult terrain (ADB 2009: 46-48). The rail modernization project included in the top priority list of the National Development and Innovation Committee has a cost of US$800 million. The government has only recently approved plans for 5,000 km of new rail lines to be built in phases over the next few years.[15] If the cost estimates per km are accurate this is a minimum of US$5 billion of new investment.

2.4.3 Investment Climate

The government is committed to an improvement in the business environment by streamlining public bureaucracy and reducing the scope for informal payments to circumvent licensing and other regulatory requirements. The Business Investment Council, a high-level body chaired by the Prime Minister, was set up in 2008 with the support of the EBRD, to co-ordinate and to oversee such a

[15] 'Mongolia's rail project on track to shift exports' *Financial Times*, 14 April 2010.

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dialogue.[16] In addition, private-sector bodies, such as the Mongolia National Chamber of Commerce, make representations on changes they would like to see introduced. Mongolia takes its ranking in the World Bank Doing Business country survey very seriously, to the extent that it aims to become one of the top ten regional destinations for doing business in Asia by 2012. Table 8 gives the position of Mongolia and several Central Asian comparator economies in the 2010 survey.

Mongolia's overall ranking is middle level (60th out of 183 countries) and not very different from earlier years. Mongolia's FDI is not likely to increase given its relatively poor business rankings and tight world credit markets. However, it appears to have made significant improvements in the area of contract enforcement (36th in 2010 as compared with 51st in 2004), and it also does reasonably well under the headings of protecting investors and registering property. Where it compares very unfavourably with other countries (155th) is in the area of foreign trade (for example in the cost and time required to export) due to the transport bottlenecks, although export costs per container are now below those in the Central Asian Republics included in Table 8. This conclusion is also supported by the country's ranking by the World Bank Logistics Performance Index where Mongolia comes 136th. It should be noted that this relatively positive picture in terms of improvements to the legal position and gradual reduction in corruption is at odds with the conclusions of the firm survey conducted by the ADB as part of its review of private-sector operations in Mongolia (ADB, 2009: 18-1). Although the sample size is relatively small and restricted to Ulaanbaatar, both contract enforcement and other legal issues are mentioned as problems by many firms.

Table 8. Doing Business indicators 2010: selected indicators and countries

Country	Tax rate on profits (%)	Documents required for export (number)	Time for export (days)	Cost to export (US$ per container)	Procedures for enforcing contracts (number)	Cost of enforcing contracts (% of debt)	Time for enforcing contracts (days)
Mongolia	22.8	8	46	2,131	32	30.6	314
Azerbaijan	40.9	9	46	2,980	39	18.5	237
Kazakhstan	35.9	11	89	3,005	38	22.0	390
Kyrgyz Rep.	59.4	7	63	3,000	39	29.0	1,460
Uzbekistan	94.9	7	71	3,100	42	22.2	195
Cambodia	22.7	11	22	732	44	102.7	401
Vietnam	40.1	6	22	756	34	28.5	295
East Asia-Pacific average	36.1	6	23	909	37	48	538

Source: World Bank, *Doing Business 2010* (available at www.doingbusiness.org).

Further insights into the business environment as perceived by firms are given by the *Doing Business* rankings, which allow a comparison of the results for Mongolia, the East Asia and Pacific region, and the World. Selected indicators from this survey are summarized in Table 9. They show that firms in Mongolia report that they wait longer than firms elsewhere to obtain licences and a higher proportion than elsewhere expect to give unofficial payments to receive these. However, corruption is not perceived to be a particular problem as compared with elsewhere and a much lower proportion of firms expect to have to make payments 'to get things done' than in the region generally. Trade facilitation appears more of a problem than elsewhere, however, and in particular time for exports to clear customs, at an average of 19 days, is three times the global average.

[16] The establishment of a high-level council on industrial policy for competitiveness chaired by the Prime Minister or President is one of the central recommendations of Hausmann and Rodrik (205: 77) for the implementation of their vision of industrial policy.

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Table 9. World Bank Enterprise Survey 2009: selected results

Variable	Mongolia	Region	World
Days to obtain operating licence	44	26	28
Days to obtain construction permit	73	43	67
Firms identifying licensing as major constraint (%)	32	14	16
Firms expecting to make informal payments to get things done (%)	30	60	30
Firms expecting to give gifts to get licence (%)	31	18	16
Firms identifying corruption as major constraint (%)	31	30	37
Days for exports to clear customs	19	5	6
Firms identifying customs and trade regulations as major constraint (%)	24	18	17

Source: Mongolia National Chamber of Commerce and Industry (2009), *Snapshots of the Mongolian Economy: The Tool for Policymakers and Business Leaders*.

2.4.4 New Technologies and Skills Development

Despite its relatively well-developed education system inherited from the Soviet tradition, Mongolia remains far from a skill-based economy. The most detailed evidence on technology development and skills comes from an analysis of firm survey data collected in 2004-5 by the World Bank as part of its investment climate work (World Bank 2007d). This reveals that roughly one third of all firms identify a skills shortage as either a major or a severe constraint, whilst in the garment sector the proportion is over half. A lack of problem-solving ability and insufficient knowledge of the English language and computing are cited as generic problems. Within manufacturing, firms tend to give computers to only a small minority of workers and only a minority of firms conduct any R and D of their own, although around half report introducing a new technology that changed the way in which they operate (see Table 10).

Table 10. Technology and innovation in Mongolian manufacturing firms (2004)

Firm category	% of staff working with computers	% of firms conducting R and D	% of firms which introduced a new technology
Textiles	9.0	37.5	43.8
Wood products	8.7	33.3	44.4
Food and beverages	11.2	38.8	50.0
Garments	2.7	24.4	48.9
Tanning of leather	6.2	18.2	54.6
All firms[a]	20.6	33.1	38.8

Note: [a] Covers all sectors.

Source: Mongolia Investment Climate Survey 2004, cited in World Bank (2007d: Table 3).

Roughly half of manufacturing firms provide some training, although only to a small minority of workers, the vast majority of whom are initially classed as skilled. Hence firms themselves do little to upgrade unskilled workers (see Table 11).

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Table 11. Training in Mongolian manufacturing firms

Firm category	% of firms offering training	% of workers receiving training	% of skilled workers out of those receiving training
Textiles	62.5	19.1	71.7
Wood products	22.5	14.6	70.0
Food and beverages	50.0	26.1	73.2
Garments	46.7	19.4	65.8
Tanning of leather	54.6	19.3	83.3

Source: Mongolia Investment Climate Survey 2004, cited in World Bank (2007d: Table 4).

There is a growing dualism in the labour market, with a small protected segment benefitting from social insurance and employment protection and a growing informal sector. Although the education system is producing proportionately large numbers of school, vocational and higher education graduates, firms' responses to the survey express serious concerns over the skill mix available. Out-migration of well qualified graduates is also an issue, although it has provided a significant stream of remittances.

The Strategy document reveals an awareness of the skills gap that has emerged in Mongolia since the transition. It refers to a plan to establish both training and separate research centres, and sets an ambitious national target of 3 per cent of GDP being spent on R and D by 2021. Given the very low existing level of R and D undertaken, this looks highly ambitious. Furthermore, two of the top priority projects of the National Development and Innovation Committee involve high-technology activities – the development of a science park for a projected 22 companies in the bio- and nano-technology fields and an information technology training and research centre. The combined cost of these schemes is put at US$500 million. The lack of an existing technological base in these areas makes these extremely ambitious projects, whose implementation may well have to be scaled back.

2.5 Mongolia: Export Structure and Comparative Advantage

Where new ideas and new products come from will be determined by the initiative of the private sector. There is ample evidence, as discussed above, that Mongolia's industrial structure is skewed towards a small number of categories. However, if there are many goods into which Mongolia could potentially move, production of high-skill and technology-intensive goods is likely to be held back by the skills and knowledge gap between Mongolia's current attainment and world best practice that has widened since the transition. Detailed insight into existing comparative advantage is available from an analysis of export data for 2006, the most recent year for which 4-digit level data are available, from the UN COMTRADE database. This reveals a highly skewed structure in which manufactures have a very minor role. Table 12 gives all the 4-digit HS categories in which Mongolia had a revealed comparative advantage in 2006 (defined as categories where their share in Mongolia's exports exceeds the categories' share in world trade). It also shows whether Mongolia was gaining or losing world market share in these categories and the PRODY value for each category. Since Mongolia's exports are highly concentrated, these categories cover about 96 per cent of total exports in 2006. Moreover, of this the bulk, 74 per cent, was in mineral exports, 15 per cent in foods or animal-related products like leather and only 7 per cent in manufacturing. In other words manufactures in which the country had a revealed comparative advantage (RCA>1.0) accounted for only 7 per cent of total exports in 2006. The majority of this 7 per cent was in textiles.

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Table 12. Mongolia's comparative advantage in 2006

HS category	Description	RCA	Change in world market share 2000-2006	PRODY US$2006
Non-manufactures				
0115	Meat of horses	119.7	+	9,387
0116	Edible offal	2.4	+	13,950
0129	Meat	11.9	n. s.	10,869
0577	Nuts	3.7	+	4,904
0619	Sugar	2.4	n. s.	2,428
2112	Calf skins	29.4	+	4,817
2114	Goat skins	3.9	-	2,470
2119	Hides and skins	1.7	-	8,159
2120	Rape seeds	4.4	n. s.	15,599
2633	Cotton waste	1.9	n. s.	4,623
2682	Wool degreased	27.3	+	19,413
2683	Fine animal hair	2,025.9	+	3,163
2685	Horsehair	333.4	+	4,492
2686	Waste wool	61.1	+	10,819
2687	Sheep wool	745.8	+	3,566
2785	Quartz	198.3	+	5,310
2815	Iron ore and concentrates	2.8	n. s.	16,842
2871	Copper ore	117.9	-	8,442
2874	Lead ore	2.5	n. s.	9,137
2875	Zinc ore	60.2	n. s.	6,437
2879	Ores and concentrates	26.2	+	4,781
2911	Bones and ivory	6.3	-	1,839
2919	Other materials of animal origin	5.5	-	8,561
3222	Other coal	5.5	-	14,893
3223	Lignite	5.9	n. s.	7,342
6114	Leather	1.9	+	9,413
6115	Sheep and lamb leather	113.7	+	2,793
6116	Leather of other hides	22.6	+	4,738
Manufactures				
6253	Tyres for aircraft	2.6	n. s.	10,759
6354	Wood manufactures	2.7	+	3,762
6512	Yarn of wool	1.6	+	14,263
6583	Travelling rugs	1.0	-	8,707
6592	Carpets	5.6	-	5,415
6821	Copper alloys	1.7	+	8,181
6852	Lead alloys	2.5	n. s.	11,549
7243	Sewing machines	1.5	+	7,530
8423	Male outerwear textile fabric	1.1	-	8,410
8424	Male outerwear textile fabric	2.6	+	9,453
8432	Female outerwear textile fabric	2.8	-	6,600
8439	Female outerwear	2.6	-	10,549
8441	Undergarments textile fabric	5.3	-	7,947
8451	Outerwear knitted	2.7	-	15,241
8452	Outerwear knitted	6.6	+	10,657
8459	Outerwear knitted	1.1	-	11,189
8462	Undergarments cotton	2.6	+	10,266
8483	Fur clothing	1.2	+	17,808
Others				
9419	Live animals	16.1	+	5,542
9710	Gold	26.0	+	3,685

Notes: n. s. means non-specified due to gaps in data. RCA is the share of category x in Mongolia's exports divided by the share of category x in world exports.

Source: Calculated from UN COMTRADE database.

Table 13 gives a breakdown of all 4-digit HS textile categories. It shows that even within this relatively established sub-sector not all products had a comparative advantage, and in many categories exports declined over the period 2000-2006, with a consequent loss of world market share. The PRODY figures reveal a difference in values between categories and the fact that whilst Mongolia has

a comparative advantage in some of the higher value categories it does not in others (such as HS 8429, 8465, 8472, 8482). Overall Mongolian textile exports in total declined by 3.1 per cent annually in 2000-2006. The large fluctuations between categories imply inconsistent classification between years. This is a cause of the very low RCA ratios in some categories, which in some instances are close to zero because of very low export values in 2006.

This problem of inconsistency in trade classification is almost certainly the explanation for the emergence and then disappearance of new export products, many of them manufactures. The World Bank (World Bank, 2007a: 24) used the apparent emergence of new products, a majority of them manufactures, as evidence of innovation in Mongolia. However, the UN COMTRADE export statistics show many zero entries at the 4-digit level in the years up to 2005, while in 2006 there are entries in all 4-digit categories, suggesting a re-classification, rather than genuine new exports.

Table 13. Mongolia's textile exports

HS category	Description	RCA 2006	PRODY US$ 2006	Annual export growth (%) 2000-2006
8421	Male outerwear: textile fabrics	0.10	8,617	-57
8422	Male outerwear: textile fabrics	0.96	8,245	-24
8423	Male outerwear: textile fabrics	1.13	8,410	-23
8424	Male outerwear: textile fabrics	2.58	9,453	23
8429	Male outerwear: textile fabrics	0	10,699	-70
8431	Female outerwear: textile fabrics	0.15	9,853	-25
8432	Female outerwear: textile fabrics	2.79	6,600	-14
8433	Female outerwear: textile fabrics	0.05	8,205	-41
8434	Female outerwear: textile fabrics	0.36	8,087	-5
8435	Female outerwear: textile fabrics	0.49	8,389	-25
8439	Female outerwear: textile fabrics	2.60	10,549	5
8441	Under-garments: textile fabrics	5.28	7,947	-3
8442	Under-garments: textile fabrics	0.24	7,956	-25
8443	Under-garments: textile fabrics	0	6,908	-50
8451	Outerwear knitted	2.70	15,241	-6
8452	Outerwear knitted	6.56	10,657	77
8459	Outerwear knitted	1.06	111,189	6
8462	Undergarments	2.64	10,266	126
8463	Undergarments	0.54	9,947	72
8464	Undergarments	0.07	5,316	-11
8465	Corsets, garters	0	12,035	n. s.
8471	Clothing accessories: textile fabrics	0	7,907	-54
8472	Clothing accessories: knitted	0.02	11,180	22
8481	Apparel: leather	0.04	8,604	90
8482	Apparel: other	0	11,066	n. s.
8483	Fur clothing	1.17	17,808	14

Notes: n. s. means non-specified due to gaps in data. RCA is the share of category x in Mongolia's exports divided by the share of category x in world exports.

Source: Calculated from UN COMTRADE database.

The top 25 HS 4-digit categories listed in Table 14 contributed 93 per cent of the EXPY for Mongolia in 2006, with copper alone contributing nearly 50 per cent. Manufactures comprise nine out of the 25 categories, but in total they contribute only 9 per cent to EXPY with textiles contributing virtually all of this.

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Table 14. Mongolia's Top 25 product categories by contribution to EXPY 2006

Commo-dity	Description	% total Mongolian exports	Contribution to Mongolian EXPY	Rank
2871	Copper ore and concentrates; copper matte; cement	41.34%	3490.4	1
9710	Gold, non-monetary	17.57%	647.7	2
3222	Other coal, not agglomerated	2.93%	436.8	3
2875	Zinc ores and concentrates	5.93%	381.7	4
2687	Sheep's or lambs' wool, or of other animal hair, etc.	5.40%	192.6	5
3330	Crude petroleum and oils obtained from bituminous	1.29%	182.2	6
8451	Outerwear knitted or crocheted	1.15%	174.7	7
2879	Ores and concentrates of other non-ferrous base me	3.19%	152.6	8
2683	Fine animal hair, not carded or combed	4.34%	137.4	9
2815	Iron ore and concentrates, not agglomerated	0.75%	125.8	10
8439	Women's, girls', infants' outerwear, textile, etc.	1.18%	124.9	11
2785	Quartz, mica, felspar, fluorspar, etc.	2.28%	121.1	12
8462	Undergarments, knitted or crocheted, etc.	0.98%	100.7	13
6821	Copper and copper alloys, refined or not, etc.	1.05%	86.2	14
0115	Meat of horses, asses, mules and hinnies, fresh, etc.	0.67%	62.8	15
8441	Undergarments of textile fabrics, etc.	0.68%	53.7	16
2682	Wool degreased, uncombed of sheep or lambs	0.28%	53.7	17
8459	Outerwear knitted or crocheted, not elastic, etc.	0.48%	53.5	18
6115	Sheep and lamb skin leather	1.60%	44.7	19
8452	Outerwear knitted or crocheted, not elastic, etc.	0.38%	40.9	20
6114	Leather of other bovine cattle and equine leather	0.41%	38.5	21
7810	Passenger motor vehicles (excluding buses)	0.19%	34.9	22
2919	Other materials of animal origin	0.31%	26.9	23
8423	Men's and boys' outerwear, textile fabrics, etc.	0.31%	26.0	24
0111	Bovine meat, fresh, chilled or frozen	0.31%	25.1	25

Source: calculated from COMTRADE data base.

The export structure shows many distinct gaps, with Mongolia not exporting many high value goods (in terms of PRODY). Therefore there is ample scope to move into new, higher value goods. The difficulty of moving into a new product is linked directly with the degree of specificity of the assets, capabilities and operating environment (such as the physical assets, labour skills, technological knowledge and infrastructure needs) associated with the products in which a country is currently specialized. Where these attributes are either very general – that is relevant for the production of a wide range of goods – or production conditions are similar in the new products, the transition to a new specialization may be relatively easy. Thus for example it could be expected to be easier for Mongolia to move to higher value textile products than to production of pharmaceuticals, since the skills sets and technologies required by this latter combination of goods are different. For any economy there will be some 'new goods' (ones in which it is not currently specialized), which are relatively easy to move into. These are 'nearby' products where economic distance is low, due to the similarity of the assets and capabilities they require relative to those needed by the economy's current pattern of specialisation.

The concept of economic distance is developed formally by Hausmann and Klinger (2006) who calculate the probability that two countries will both have a comparative advantage in different pairs of products. The higher the probability the lower is the distance between the two products. If products are grouped by broad classifications some are found to be peripheral in the sense that distance is low within the group, but high between the group and others. These peripheral groups are typically primary products, but also include garments. Groups where distance is particularly low and where it is relatively easy to move between products are machinery and capital-intensive manufactures (Hausmann and Klinger 2008: 21). Countries already specialized in these goods should therefore find

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it easier to develop new exports products, whilst those like Mongolia, where specialization is in peripheral groups, face a greater challenge.

2.6 Summary

- The current industrial structure and trade specialization is highly skewed and there are many manufactures that Mongolia currently does not produce. The development of new activities is best left to the decisions of the private sector with the government providing support in the form of credits, improved infrastructure, and training and education initiatives. Nevertheless, one would expect these new activities to be initially in areas economically close to existing activities in mineral and garment production, rather than in brand new manufacturing initiatives.

- It should not be assumed that mineral processing is necessarily economically viable and sensible for economies with mineral reserves. This applies to both copper smelting and coal cleaning, as well as a range of metallurgical activities.

- Other options for industrial diversification include the modernization of traditional activities, such as textiles, and the development of totally new activities.

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3. The Mining Sector

3.1 Introduction

Mineral experts and multinational mining companies are aware of the vast mineral deposits in Mongolia. Recently, the country's mineral endowment has attracted considerable attention from the international press. The following quotations are a sample from national and international newspapers highlighting the potential interest of multinational mining companies in exploiting the mineral deposits of Mongolia, and the attention that the Mongolian government wants to give to its mining sector:

> "A number of multinational companies, BHP Billiton Ltd., India's Jindal Steel & Power Ltd. Brazil's Vale and Peabody Energy Corp, among others, are competing for the rights to develop Mongolia's prized US$2 billion Tavan Tolgoi coal mine, which is often referred to as the world's biggest untapped coking coal deposit. Mongolia will take a 51 per cent stake in the coal mine and auction the remaining 49 per cent to bidders" (*The UB Post*, 1 June 2010).

> "Mongolia has world-class reserves of gold, copper, coal fluorspar, silver, uranium and tungsten, but has been deterred by a combination of corruption and political instability. Mongolia wants to attract US$25 billion in investment over the next five years to build roads, railways and new towns needed to exploit its natural wealth" (*The Daily Telegraph*, 12 April 2010).

> "Mongolia, a resource-rich country lacking roads and rail, has taken its first step in building the infrastructure required to be a leading commodities exporter, after it approved construction of more than 5,000 km of railways...Mongolia is emerging as one of the world's premier frontiers for copper, coal, gold and iron ore. Its proximity with China, the world's biggest consumer of many raw materials, is a huge advantage, along with the sheer volume of metals beneath its grasslands. But it remains one of the world's most remote places, and the country's lack of basic infrastructure undermines its prospects" (*The Financial Times*, 14 April 2010).

A crucial strategic question for economic development is how far it is economically justifiable to adopt the adding value strategy for mineral processing that is a central plank of Mongolia's current development strategy, rather than relying on exporting minerals in unprocessed form. Some proposals currently under debate imply moving to copper smelting and refining and steel-making, as well as coal treatment and enrichment to produce power. The economics of processing involves a comparison between the net value addition (and any transport cost saving) and the extra capital and related costs of processing. Processing of some, or all, of the minerals may be justifiable but the case needs to be made carefully and not simply assumed. The industrialization experiences of many countries provide a warning that simply because it is technically possible to produce particular goods because of the availability of natural resources, domestic production is not necessarily economically sensible. This applies not just to copper smelting but to the range of metallurgical activities covered by several of Mongolia's priority projects. The scale of production and the potential market will be critical factors. Also, given the position of China, it will be important to assess whether there will be a demand for the processed products in China.

Mongolia has major reserves of 80 different minerals including copper, gold, coking coal, iron ore, fluorspar, molybdenum, and crude oil. The Oyu Tolgoi mine, in particular, is said to be the world's

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largest copper mine (Boston Consulting Group, 2009). Copper concentrate and gold dominate exports, and the high copper prices of 2006-2008 provided a major boost to government revenues, and fostered the current policy aim of a rapid transformation of the economy to middle-income status by 2021. According to the USGS (2009) the most important minerals in Mongolia are the following: non-ferrous metals: copper, gold, lead, zinc; ferrous metals: iron; energy minerals: uranium and coal; and other minerals: metallurgical coke and fluorspar.

This chapter considers whether it makes economic sense for the country to engage in costly projects in order to increase the value-added of some of its abundant minerals. To make specific decisions on which minerals to process, comprehensive feasibility studies are required, which is beyond the scope of this study.

3.2 Distinctive Characteristics of the Mining Industry

The mining industry can be best understood as a global industry where there are a great number of companies participating in each mineral market. The large number of companies in different mineral markets suggests that entry and exit to these markets is not difficult. It seems that established mining companies are not capable of blocking the access of new firms. Indeed, rather than obstructing it , they often welcome the entry of new firms in order to have more opportunities to specialize their own activities and to diversify investment risk. For instance, by establishing joint ventures, major companies can reduce their risk exposure to different investment projects, especially in countries with high political instability.

In general, finding mineable resources and developing the infrastructure necessary to operate a new mine requires considerable initial investment in specific assets (e.g., engineering and consulting services, open-pit or underground mine construction, mechanical shovels, cranes, heavy trucks, mining ramps, etc.). Once a mine is built, the initial investment becomes irreversible and much of it also becomes irrecoverable. The time between the initial investment and positive cash flow is often more than 20 years. This creates tremendous investment risk. Incumbents have the advantage of having a diversified portfolio of projects at various stages, which reduces their risk, and also have access to credit markets that are typically not available to new firms. Growth therefore tends to be fairly slow, with new firms starting small and growing over time as they build their asset base.

Exit from mining is mainly constrained by these large fixed investments and sunk costs that cannot be easily recovered and restrict the capacity of mining companies to shut down operations and walk away. There are other relevant barriers to exit. High closure costs associated with land reclamation and environmental restoration of mine sites may force mining companies not to leave the business in order to avoid these significant costs, at least for some time. There are also social pressures to continue mining, as mining activity in rural areas is often the only source of non-agricultural employment.

3.3 Mineral Markets for Mongolia

Minerals have standardized features; they are widely traded internationally, and their prices are set according to variations in world supply and demand. Within each mineral type the product is relatively homogeneous, and branding is difficult. Diamonds have been the only mineral to pursue branding successfully. Minerals can also be substituted for each other in their uses. Copper and aluminium are substitutes in the conduction of electricity, and energy commodities are substitutes in the generation of heat. Such homogeneity and substitutability severely limit the market power of any one producer or group of producers.

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Prices tend to vary across mineral commodities according to their relative scarcity; production costs, which depend on the technology employed to extract the commodity; the characteristics of the deposits; tax regimes applied to each mineral product in different countries; transportation costs (affected by the location of the major centres of consumption for each particular mineral); the existence of quasi-rents required to cover past investments; macroeconomic fluctuations (e.g. changes in global aggregate demand and variations in exchange rates), and pure rents originated by market power.

Table 15. Industrial features of minerals

Mineral	HHI at a country level	HHI at a firm level	Share of world production by companies	Share of world production by countries in 2009 (%)
Copper	1,621, moderate level of concentration	558, low level of concentration	Fifteen companies produced 66% of overall copper production in 2009.	Chile (33.7%); Peru (7.9%); United States (7.5%)
Copper smelters	945, low level of concentration	959, low level of concentration	Three companies (CODELCO, Freeport-McMoran and BHP) had control over 28.9%	China (23.6%); Japan (10.7%); Chile (10.6%)
Copper refiners	1,009, low level of concentration	977, low level of concentration	Three companies (CODELCO, Aurubis and Freeport-MCMoran) had control over 22%	China (22.0%); Chile (17.5%); Japan (7.7%)
Gold[a]	1,001, low level of concentration	805, low level of concentration	Five companies (Barrick, Newmont, Anglogold Ashanti, and Gold Fields) possess 27.8% of the market	China (12.8%); Australia (9.4%); United States (8.9%)
Iron ore	2,290, high level of concentration	950, low level of concentration	Fifteen companies produced 56%	China (39.7%); Brazil (16.8%); Australia (16.3%)
Coal [b]	From 8,450 to 1,061	839, low level of concentration	The sixteen largest companies control 31%	China; United States; Ukraine; Russia; Australia
Uranium	1,445, moderate level of concentration	1,156, moderate level of concentration	Sixteen companies control 96%	Canada (20.1%); Kazakhstan (19.7); Australia (19.6%)
Lead	1,703, moderate level of concentration	2,077, high level of concentration	China's state-owned companies control 43.3%	China (43.3%); Australia (13.2%); United States (10.2%)
Zinc	1,467, moderate level of concentration	958, low level of concentration	Fifteen companies control 15.5%	China (25.1%); Peru (13.2%); Australia (11.7%)
Fluorspar	3,880, high level of concentration	Information not available	Information not available	China (58.9%); Mexico (18.1%); Mongolia (5.5%)

Notes: [a] Other fundamental factors like global demand fluctuations, financial turmoil, or the buying or selling gold by central banks are major market drivers that can have a more important effect on gold prices than industry concentration and oligopoly power. [b] Usually coal is classified into four main types: anthracite, bituminous coal, sub-bituminous coal and lignite. This ranking depends on the quantity of carbon atoms that each type contains and on the amount of heat energy that each kind can produce. China is the largest producer of coal worldwide. It produces 91.85 per cent, 38.03 per cent, and 10.00 per cent of total anthracite, bituminous coal and sub-bituminous coal production, respectively.

Source: Based on Davis (2010).

Table 15 shows the degree of concentration in the various commodity markets at country and industry level by using the Herfindahl-Hirschman Index (HHI). It is calculated by summing up the squares of the individual market shares of all the participants in a relevant market. Its value goes from 0, meaning no concentration, to 10,000, meaning absolute concentration by one producer. According to the industrial organization literature a high level of concentration might be associated with the exercise of market power and, possibly, with adverse competitive consequences. A low degree of concentration

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means that it is unlikely that few individual companies are able to take over the market by setting prices.

Table 15 also shows the companies that control the production of specific minerals and the share of world production accounted for by the top three countries.

Primary mineral producers generally do not gain market power by differentiating their products. Differentiation may be relevant for trading final products like copper wire, rods, finished steel, and gem quality diamonds. However, markets for final products are usually beyond the scope of mining companies, so product differentiation is, in general, not a concern for producers. This fact contributes to the degree of competition in the mining industry, because market power generated through product differentiation is often ruled out.

Mineral commodities can also be substituted by other commodities or materials. In this context, primary mining producers of a particular commodity face strong competition from both substitutes and the secondary supply of the commodity (i.e. scrap recycling). Thus, primary producers face a very competitive environment in the minerals markets.

3.4 Processing Minerals

International evidence suggests that it is not inevitable that countries with processing industries will themselves have mineral deposits. Raw material or mineral exporters are more likely to move into simple manufactures like garments than into mineral processing. International trade specialization in pairs of products (measured by the probability that a country exports both with a comparative advantage) is explained in a regression model that uses as independent variables measures of product technological characteristics, factor endowments and the strength of a forward linkage (that is the extent to which one product is an input into another as measured by data from the US input-output table). If processing is important as a form of specialization, it is to be expected that the degree of forward linkage from good A to good B will have a strong and significant impact on the probability that any country exports both products. However, forward linkages prove to have a much weaker impact in explaining joint exports than do factor endowments or technological characteristics of products. Hausmann *et al*. (2008b) explain this by reference to the concept of national capabilities, so that countries producing primary goods such as minerals have a skill set which is closer to that required by other primary goods or technologically simpler consumer goods than that required by downstream mineral processing. In the context of mineral processing in South Africa (what they term beneficiation) they conclude that:

> "There is no reason to pay special attention to downstream sectors at the expense of missed opportunities from the entire set of 'lateral' sectors that don't currently exist. The case is actually stronger: not only is such an approach without conceptual justification: it is a bet against the whole of international experience. Quite simply beneficiation is a bad policy paradigm." (Hausmann *et al*., 2008b: 3).

The warning is salutary, although generalizations of this sort need to be treated with caution. The question of the economic viability of moving into mineral processing can only be resolved on a project-by-project basis through careful analysis of feasibility studies and projections of world market trends. The costs and benefits to a country over time need to be estimated and rates of return compared with the appropriate alternatives available.

If foreign investors are involved in the co-funding of the proposed projects they will also need to be convinced of the viability of the schemes. If foreign investors are cautious about investing the

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government should also think carefully about the viability of the project. In the absence of positive externalities, where private investors are reluctant to invest on the basis of the expected financial returns, the only economic reason that would justify the government offering an incentive package would be a difference between the government's and the foreign private sector's discount rate.

Following standard textbook procedures, a project is acceptable when its discounted stream of net benefits (net present value - NPV) is positive at the discount rate.[17] There can be different interpretations of the discount rate, with foreign investors often adding a significant country risk premium and applying a rate that is well above either the real return available on other investments in the host country or the real return available in low-risk financial assets internationally. As far as a government in a low-income country is concerned, its discount rate is usually defined as an opportunity cost rate reflecting real returns on alternative investments. Hence, to put things simply, if a foreign investor looks for a 20 per cent return in real terms, it may reject a project that makes a return of 12 per cent, even though this is a return that is above the government's discount rate and hence is higher than the return available on other investments in the country either domestically or internationally. If foreign investment is essential for a project to go ahead, then it is justifiable for the government to offer the investor an incentive package.

The gains to Mongolia from a foreign investment project will be determined by how much of the net financial benefits remain with the Government as royalties, profit taxes, and its share of dividends. In addition, any positive externalities not captured as financial benefits will also remain in the country, for example as gains to otherwise underemployed workers who get work either directly on the project or indirectly in supplier activities. However, it should also be remembered that there may be additional costs that fall under the heading of externalities – for example, infrastructure investment in transport links from the project site to the border that is not paid for by the project itself, or local environmental damage, the cost of which is not picked up by the project as mitigatory expenditure. The full economic return to the project must include the financial net benefits plus or minus these additional external effects. The financial package offered to foreign investors – for example, royalty and profits tax rates, years of tax holiday and duration of mining leases – will have an important impact on the distribution of the net benefits between government and foreign investors. Other things being equal, higher tax and royalty payments raise the gain to the country but if they are too high they will deter foreign investors. Hence the outcome will be one of bargaining, with the more competition there is for mining leases and processing rights between investors, the stronger the government's negotiating position and the higher these rates are likely to be.

Box 6 gives illustrative calculations based on the recent presentation of the Boston Consulting Group, which examined the feasibility of copper smelting and coal processing at the Oyu Tolgoi and Tavan Tolgoi mines.

[17] The alternative version has an acceptable project as one where the return on resources invested in the project over its lifetime is above the chosen discount rate.

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Box 6. Economics of mineral processing

The Boston Consulting Group (2009) examined the economic feasibility of processing and exporting coal (from Tavan Tolgoi) and copper (from Oyu Tolgoi) with associated investment in coking plant, iron smelter and an integrated railway system. It compared the additional GDP from an 'extraction and export' scenario with a 'processing and export' scenario. The latter had lower fluctuations in export revenue, and created more jobs and higher GDP. However, it had a considerably greater investment cost of US$13.9 billion (2010-2021), compared with US$4.8 billion, due to the extra investment in processing facilities, power generation and the rail network. It is impossible to check the detailed analysis in this study since only the main results are available. However, the basic question of whether the extra GDP highlighted by the study is an adequate return on the extra investment involved can be addressed in a simple way. The data on GDP in the two scenarios for 2010 -2021 can be compared to give incremental GDP due to processing. We do not have certain key data such as the phasing of the investment expenditure between years and the working life of the plants. However, for illustrative purposes it is assumed all investment is made in 2010 (since net benefits are shown as arising in 2010) and that the operating life of the plants extends to 2031. Taking incremental GDP as benefits and the extra investment cost in the comparison of the two scenarios gives the flow of net benefits 2010-2031.

This net benefit flow implies a rate of return on investment of 10 per cent; that is the Internal Rate of Return (IRR) on the additional investment required in the processing scenario is 10 per cent. This is probably above the opportunity cost of capital in Mongolia (and is certainly above the real risk-free international interest rate), but is unlikely to be dramatically so. Further there are a number of qualifications that need to be made. Even assuming the relevant export prices and cost estimates are accurate, the use of incremental GDP as a measure of benefits is likely to be an overestimate. What matters is the income that remains in Mongolia (that is change in GNP) since much of the profits to foreign companies and payments to foreign workers will ultimately leave the country. Second, not all payments to national labour need be net additions to GNP since only where all new jobs are filled by workers who would otherwise be openly unemployed will all of their wages be an economic benefit; in others words the opportunity cost of labour must be zero for the wage component of value-added to be treated as a benefit. The full picture is further complicated by the financing arrangements for the project since foreign funding is a benefit to the country when it is received and a cost when it is repaid or repatriated. To illustrate the impact of both time and financing arrangements, if it is assumed the government bears 45 per cent of the project's costs and receives 45 per cent of revenues, with these delayed until 2020 and with the project life extended to 2036, the IRR drops to 4 per cent. The conclusion is that the project is almost certainly less attractive than the analysis in Boston Consulting Group (2009) suggests, although we are not in a position to be definitive on whether this processing scheme is economically viable.

3.5 Limitations on Processing Minerals

There are several challenges unique to Mongolia that make moving into minerals processing and export either difficult or ineffective as a path to development.

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i) Unemployment

One of Mongolia's chief concerns is unemployment. Resource-based industrialization is less labour-intensive than manufacturing-based industrialization, and so producing and exporting primary processed materials is "likely to yield fewer of the distributional and social gains that East Asia reaped from massive expansion of manufacturing employment" (Owens and Wood 1997, p. 1467). Based on data from South Africa in the 1990s, Davis (1994, Table 7.3) finds iron and steel production and the production of other non-ferrous metals to be the least labour-intensive manufacturing processing activity. Labour-intensive manufacturing in value-added agricultural products and manufactures, such as textiles and apparel, would seem to be a natural area to pursue in reaping Mongolia's small comparative advantage in manufactures while at the same time providing employment. At best, resource-based industrialization would create large-scale employment only in the construction phase. Most of that employment, and the employment in the processing industries, would be what are traditionally regarded as male jobs. The labour boom in the construction phase would not bet sustained in the operating phase. The remote location of these processing plants would create a situation where there would be high local unemployment once the construction is completed.

ii) Water

Fresh water availability in Mongolia will be a major constraint on some value-added mineral processing activities. Water consumption per ton of metal at copper smelters and refineries is some 16 times the consumption at a mill. Based on Oyu Tolgoi's estimated output, around 4 million cubic metres of fresh water would be consumed annually if a 500,000 tons per year (tpy) smelter is built to accept Oyu Tolgoi's concentrate.

iii) China

Mongolia is further limited by China's mineral policy and mineral needs. China (like Japan) has an official policy of encouraging the "export of deep-processed mineral products with high added value and the import of primary mineral products" (White Paper, 2003). This policy includes tariffs on imports of refined metals but no tariff on metal ores/concentrates. Since 71 per cent of Mongolia's exports currently go to China, that country's policies will greatly influence Mongolia's ability to process minerals economically.

There is also excess regional steel and copper smelting capacity. China is the world's largest exporter of steel. The International Copper Study Group reports that there is a 5 million tpy excess copper smelting capacity in Asia. The excess is expected to grow to 6 million tpy by 2013. China alone is planning on adding 650,000 tpy capacity (Rebelo, 2009). That study states: "China will increase its dependence on foreign concentrates as few national copper mines are developed." The advantage of being located next to China is its massive and growing demand for primary materials. However, careful market analysis is needed to examine whether processed copper and steel products produced in Mongolia could be sold in China. Figures 1 and 2 show China's voracious appetite for copper and iron concentrates, importing more than 4 million tpy of copper concentrate (Oyu Tolgoi's planned capacity is 0.5 million tpy) and 400 million tpy of iron ore. There are then going to be strong market incentives that militate against value added processing of iron ore and copper concentrate in Mongolia.

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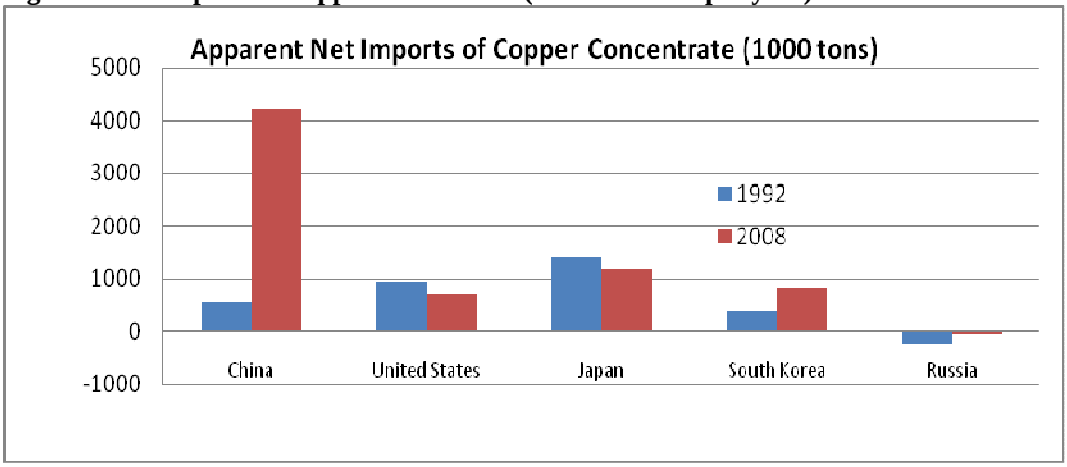
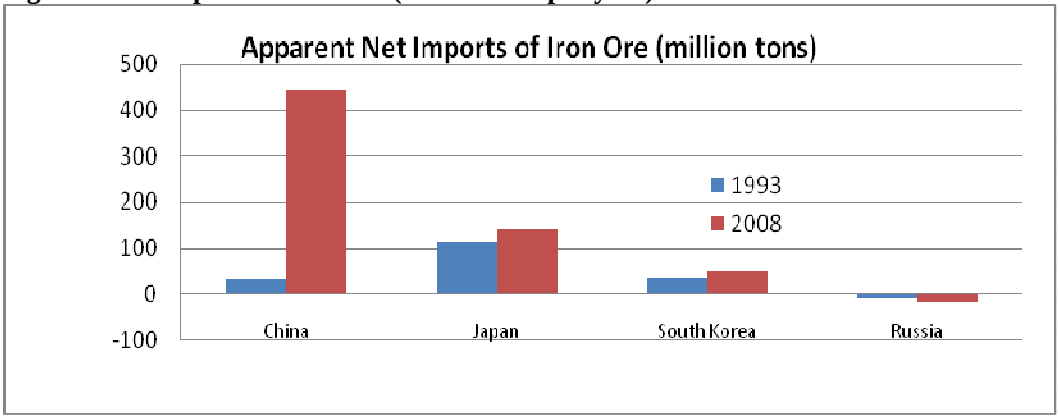
Figure 1. Net imports of copper concentrate (thousand tons per year)



Source: *World Bureau of Metal Statistics, British Geological Survey*, WTO.

Figure 2. Net imports of iron ore (million tons per year)



Sources: World Bureau of Metal Statistics, British Geological Survey, WTO, World Steel Association.

iv) Natural Environment

Mongolian official documents have repeatedly suggested that protecting the environment is a priority. Value-added mineral and energy processing consumes large amounts of environmental services, and plants that are built "clean" in Mongolia will be at a cost disadvantage to those in neighbouring countries. China's mineral processing activities are known to be particularly dirty (and cheap), although there appears to be a directed effort to improve environmental standards. One of Mongolia's strengths compared with other Asian countries would appear to be its relatively pristine steppe areas. The potential for mining and value-added processing to damage these areas and make them unsuitable for eco-tourism or biodiversity preservation should be a serious concern.

v) Export diversification, sustainability

It is difficult to see minerals processing as an effective route to export diversification or a remedy for any of the problems associated with a high export concentration. It is not mineral production that is damaging, but export concentration (Lederman and Maloney, 2007). Mineral export revenue diversification is unlikely to be successfully achieved by means of processing (iron ore, and iron and steel; coal, and electricity) due to the high price correlation between the primary and processed goods.

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Instead, export concentration can best be reduced by increasing the variety of unprocessed minerals that are mined and exported. Mongolia has a remarkably diverse mix of world-class mineral deposits, in contrast to many nations such as Chile which can only export one or two profitably. Diversification of exports via a broader metals portfolio is likely to be quite effective given the low correlation between metal prices. Changes in monthly copper and gold prices have a correlation coefficient of only 0.17, for example. Copper and iron ore prices are only correlated at 0.28, and thermal coal and iron ore at 0.19 (Davis, 2010). If Mongolia were able to establish exports in copper, iron ore, thermal coal and gold, its total export volatility would be relatively stable given these low correlation coefficients.

vi) Infrastructure

Infrastructure was listed in the Fraser Institute survey (McMahon and Cervantes, 2010) as one of the main limitations to investor interest in Mongolia's mining assets. Infrastructure development is an important co-requisite for value-added processing of mineral products. During the infrastructure construction period there needs to be progress towards a stable land tenure and mining law. Industry opinion argues that the current legal situation is far too unstable to entice foreign direct investment without the foreign parties demanding large tax concessions in payment for the high perceived risk. Such high concessions will necessarily eat into the revenue flow that the government is able to extract from the projects on behalf of the people, a politically unacceptable outcome: the 44 per cent effective project participation that Mongolia managed to negotiate for Oyu Tolgoi reflects in large part the 30-year stability agreement and resultant reduction of political risk to the private parties investing in this project.

3.6 Government Intervention

International experience suggests that mineral exporting economies need to be very careful as to how they use their mineral income. Governments generally intervene in the mining business in order to obtain revenues and stimulate domestic economic activity. Tax policies are one of the most important factors affecting the attractiveness of private-sector mining investment in a country. In addition, governments may provide other incentives to promote investment in mineral assets. Regulations covering mining operating conditions, workers' safety, and environmental damage are critical to guarantee proper functioning of the industry. Governments usually create specialized institutions like regulatory agencies in order to guarantee the proper enforcement of these regulations.

Mongolia's current production and trade patterns provide some indication as to where the emphasis on creating this value-added mineral processing might be placed. Since Mongolia currently has an open economy, existing export activities are likely to be competitively undertaken. The best value-added areas to support are likely to be those where exports are already successful or products that are similar to those that are successfully being exported in the current open market framework. The suggestion would be to support these exports (SITC Revision 2: Copper and copper alloys, refined or not, 6821; Copper and copper alloys, worked, 6822; Aluminium and aluminium alloys, worked, 6842; and, Lead and lead alloys, worked, 6852) and other activities in the SITC 68 category, non-ferrous metals, since these are likely to require similar skill sets and institutional knowledge. Identifying export markets will be a key part of this latter analysis.

Given Mongolia's relatively young democracy and its lack of infrastructure, any move to industrialization should be slow and cautious, and support for these value-added processing activities should be given only after the profitability of each capital investment has been clearly identified through rigorous financial and technical analysis. If diversification away from minerals and energy is desired, alternative supplemental development paths such as the provision of eco-tourist services or basic low-skill manufactures should be evaluated.

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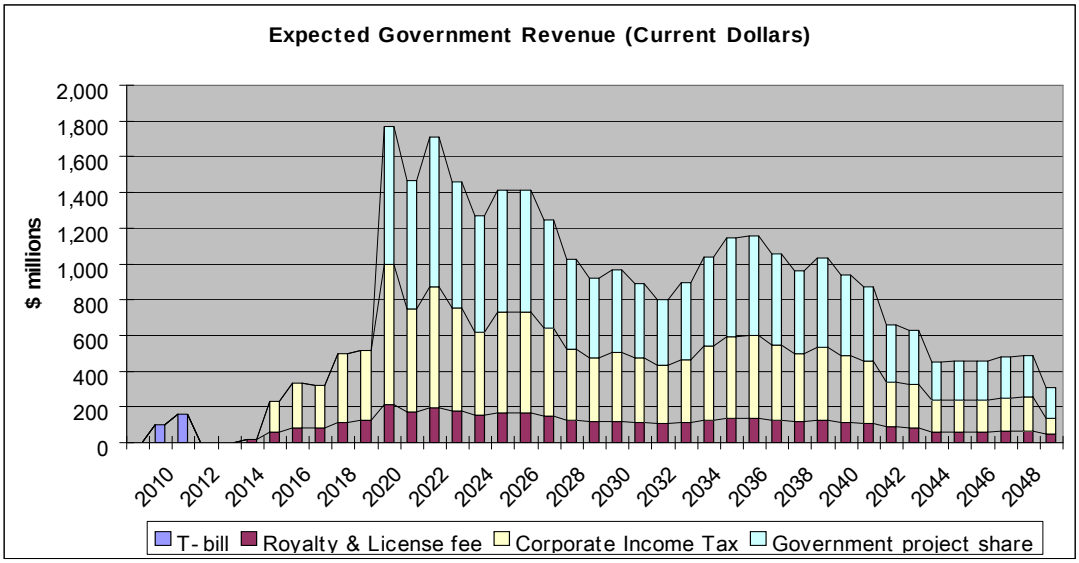
Another recommendation would be not to pursue copper smelting or finished copper product exports as these have not been shown to be economic (see Boston Consulting Group, slide 11, which recommends exporting copper concentrate rather than copper cathode). Copper smelting in the south of Mongolia is also ill-advised given China's 17 per cent import tariff on processed copper.

Many mineral and energy exporting nations have so-called Sovereign Wealth Funds (SWF). These funds generally have one of two purposes. The first is to set aside mineral tax revenues for use by future generations – the intergenerational income smoothing effect. The second is to set aside mineral tax revenues in high price environments for use in low price environments – a short-term income smoothing effect. There is little agreement among economists that the first purpose is warranted. Real welfare has been increasing in each generation for as long as such measures have been recorded, and so there is little reason to impoverish current generations for the benefit of future ones. The short-term income smoothing enabled by SWFs is more reasonable. Chile, for example, used moneys in its SWF to partially finance a US$4 billion stimulus action in 2009. According to the SWF Institute, "[t]he [Chilean] package involves direct support for low-income families, additional public investment in infrastructure, tax cuts and other incentives for private investment, enhanced access to financing by small and medium companies, additional funds for labour retraining and a new hiring incentive, among other initiatives".[18] Norway's SWF was created in 1990 in anticipation of growing government obligations towards pensioners as the Norwegian population ages.

Figure 3. Estimated annual Mongolian Government revenues from Oyu Tolgoi, year by year, by source



Source: Davis (2010).

The need for short-run income smoothing is indicated by Figure 3, which shows estimates of Mongolian government revenues from Oyu Tolgoi given forecast copper and gold prices over the life of the project. The volatility in tax income in this figure is due to changing geological and tax structures through the life of the mine. Copper and gold price volatility will further enhance the very erratic nature of these revenues. In the absence of a SWF, Mongolian officials will face immense

[18] Refer to http://www.swfinstitute.org/beta/tag/stimulus-plan/.

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pressures to spend these tax revenues as they are received, with no provisions for cutting spending in years where the tax flows fall. Governments then typically take on debt to fund the social programmes set up in the boom years in the hope that tax flows will rise again in the future. When such hopes are not realized, the mineral economies are faced with austerity programmes that can be destabilizing. It is for this reason that mineral price volatility is seen to be associated with the curse of natural resources (Davis and Tilton, 2005).

Successful SWFs require a strong legislative framework that outlines the circumstances under which spending from the fund can take place. They also require complete transparency. Revenue sterilization via offshore lending will also have to be considered if exchange rate or inflationary pressures become untenable. Among other measures recommended are a technical unit within the financial institution or a separate planning agency to apply rigorous standards of ex ante appraisal to ensure that the projects funded to diversify the economy have good prospects for success;[19] and fiscal and monetary measures to dampen inflationary pressure in sectors like construction.

3.7 Summary

- Any move to minerals value-added processing should be taken cautiously, and only after clear profitability calculations for each capital investment have been carried out through rigorous financial technical and economic analysis (incorporating the social and private benefits and costs for the economy).
- There is potential for high returns in the minerals processing industry but each project should be reviewed carefully along with the performance of world markets and the plans of competitors.
- It has to be considered that some processing (e.g. smelting) would only be profitable in the long run. A careful market analysis is needed to establish whether processed copper and steel products produced in Mongolia could be sold in China.
- Metallurgical industries tend to be male-dominated, which is not consonant with the Millennium Development Goal 3 on Promoting Gender Equality and Empowering Women. Hence alternative sources of employment need to be sought for female workers.
- It would make sense to support the four primary processed mineral goods (SITC Rev2: Copper and copper alloys, refined or not (6821); Copper and copper alloys, worked (6822); Aluminium and aluminium alloys, worked (6842); and, Lead and lead alloys, worked (6852)) that Mongolia is already exporting and other activities in the SITC 68 category (non-ferrous metals), since these are likely to require similar skill sets and institutional knowledge.
- Careful management of minerals extraction revenues via, for example, a Sovereign Wealth Fund is advisable to support the production of tradable goods, which could provide the foreign exchange necessary to diversify the economy and enhance industrialization.

[19] The "Hotelling rule" to avoid over-exploitation by depleting resources at a rate which equates the return on mineral-funded investment in other sectors with the real rate of increase in the mineral's export price is not very helpful in situations where mineral export prices are volatile and usually outside the control of individual producer economies.

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4. The Natural Fibres Industry

4.1 Introduction

About 36 per cent of Mongolia's total labour force is engaged in the agricultural sector. Products derived from pasturing livestock play an important role in the economy. Out of the natural fibres produced by different animals-cashmere, yak hair, sheep's wool, and camel hair-Mongolian cashmere has an outstanding position in world market share. Its annual production of cashmere ranks second in the world just after China's. As with many other raw materials, cashmere prices are volatile, which directly affects herders' incomes.

Many cashmere processing and garment manufacturing plants have invested in sophisticated de-hairing, spinning, dyeing, weaving and knitting equipment. The cashmere industry is made up of three types of companies, each with its own characteristics, markets and opportunities. The first type consists of early-stage processing plants, which procure raw greasy cashmere from herders or traders, scour it and produce fine de-haired cashmere for export, mainly to China, Europe and Japan. The second type consists of garment manufacturers. Most of them produce sewn garments, and the remainder knitted cashmere garments using hand-knitting machines. The third type of cashmere plants consists of vertically integrated companies, combining several operations from processing raw materials to spinning, dyeing, garment manufacturing and production of other knitted and woven products. Unfortunately, the interests of these three types of companies do not necessarily coincide. In particular, the first two respond to short-term changes in domestic and international trade regimes, rather than adopting a long-term perspective on investing in the expansion of the industry in Mongolia.

The Mongolian cashmere industry-throughout the whole production chain, from the care of the goats to the marketing of the final garments-needs to overcome several impediments to its development. The following are the most important: i) the quality of the raw fibre; ii) the co-ordination problem, which makes it difficult for herders to enter formal market arrangements with domestic manufacturers, thus compounding the lack of technical assistance to enhance breeding techniques[20]; iii) the quality of the water used in dyeing and finishing (the water needs to be very soft); iv) supply of the chemical products necessary for the treatment of the fibre; v) inadequate domestic spinning capacity, which leads some garment producers to ship raw cashmere to China for spinning, and to import the yarn for manufacturing in Mongolia; and vi) inconsistent yarn quality (it is sometimes mixed with other yarns).

However, a major issue of concern for domestic producers of cashmere products continues to be the quality of the hair, which has been deteriorating.[21] Moreover, it is of little use having high-quality raw material if promotion of the product is inadequate. The following sections of this chapter will focus on the improvement of the quality of natural fibres and the importance of marketing of the intermediate and final products.

[20] At present many herders rely on informal contacts with traders who buy in bulk by weight at prices often well below those in the formal markets in the urban centres. Some of these traders in turn unofficially export the cashmere to avoid the export tax.

[21] UNDP (2008) highlighted this issue.

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4.2 Raw Materials and Textiles

There are at least four major types of fibres: cotton, wools, cellulosic fibres and synthetic fibres. In 2009, world fibre production exceeded 70 million tons. World fibre consumption rose by 4.2 per cent; man-made fibres consumption rose 4.0 per cent (to 44.1 million tons) and natural fibres consumption rose 4.5 per cent (to 26.4 million tons). Synthetic fibres and natural fibres are competing for international markets. The natural fibres have advantages that need to be highlighted in order to maintain demand for them.

4.2.1 Raw Materials

There are four natural fibres produced in Mongolia: cashmere, yak hair, sheep's wool, and camel hair. Each one has particular characteristics and is discussed separately in its international context.

i) Cashmere

In the 17 years from 1990 to 2007, world cashmere production increased almost three times, from 3,953 tons to 9,221 tons. International demand for cashmere remains strong, despite the increased selling of low-quality articles. On the fashion side, cashmere continues to be in high demand, which should be taken into account as a base for long-term planning of cashmere products. High prices for cashmere articles are a result of shortages of raw material and growing Chinese demand for sweaters. Additionally, the winter of 2009-10 was particularly harsh and a large number of animals died.

In 2009, Mongolia had almost 42 million head of livestock, of which goats accounted for 46 per cent. Related to the increasing number of goats, Mongolia produced 6,700 tons of raw cashmere, accounting for about 28 per cent of the total world supply. The number of cashmere goats increased almost 300 per cent between 1990 and 2009. At the same time, the amount of raw cashmere has increased 4.5 times (see Table 16). But the increase of cashmere yield affected the quality of the fibre adversely due to malnourishment of goats.

Table 16. Number of goats and production of raw cashmere in Mongolia

	1990	1995	2000	2005	2009
Number of livestock (thousands)	25,857	28,572	30,228	30,398	41,995
Number of goats (thousands)	5,126	8,521	10,270	13,267	19,465
Goats in total livestock (%)	20%	30%	34%	44%	46%
Raw cashmere (tons)	1,500	2,100	3,300	3,760	6,700

Source: *Statistics Yearbook of Mongolia*, 1990-2009.

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In the production of raw cashmere, the following issues should be highlighted. Grading and sorting are not undertaken by herders and traders, but by factory employees. The quality of the fibres depends on the season, as for any other agricultural commodity. Thus it is necessary to define a set of objective parameters to ensure that the quality of the fibre is of the required standard. It would be desirable for auctions to be held regularly, and it needs to be investigated how to achieve this and ensure that herders obtain premium prices for quality cashmere.[22] For example, the fibre's strength is important. A long and weak fibre is less good than a shorter and stronger one. The carding operation breaks the weak fibre into pieces, leading to low yields and increased waste. A long and strong fibre is desirable, because it gives low wearing propensity in the finished product.

The minimum strength of the fibre has to be controlled and herders should be rewarded for improving the quality of their cashmere by being offered a premium price. So far improvement schemes have failed. For instance, UNDP (2008: 63) reports that "[t]he Mongolian Parliament passed a decree in May 2008 to commit state subsidies to domestic cashmere processing industries that purchase Mongolian raw cashmere from herders for not less than MNT30,000-32,000 (about US$26-28)". Positive effects from the change of policy were expected within three to four years. The problem of different white shades can be tackled in a similar way. Currently manufacturers are bleaching the fibre, but even when done carefully damage is visible in the end product.

Table 17. Exports of cashmere products

Indicators	Unit	2005	2006	2007	2008	2009
Scoured cashmere	Tons	381	1,676	1,511	1,929	3,558
	Thousand US $	13,445	63,065	63,428	77,229	91,209
De-haired cashmere	Tons	919	1,428	1,785	1,567	1,433
	Thousand US $	52,794	81,741	114,277	97,614	60,289
Finished products	Thousand pieces	492	498	636	689	660
	Thousand US $	17,551	18,044	13,678	27,740	29,222
Total exports	Thousand US $	83,790	162,850	191,383	202,583	180,719
Exports compared to previous year	%		94%	18%	6%	-11%

Source: National Workshop on Cashmere Industry (2009).

Between 2005 and 2009 exports of low value added cashmere (scoured cashmere) rose sharply in terms of both volume and value, growing much more rapidly than exports of finished cashmere goods (see Table 17). In the early 1990s there was an export ban on raw cashmere. In 1997 with entry to the WTO this was replaced by an export tax, which was widely circumvented by smuggling. Traders buying for the Chinese market offered higher prices than domestic processors. The problem is to offer herders an adequate price to continue to supply high-quality cashmere while at the same time ensuring sufficient supplies reach domestic processors to allow the expansion of the high-quality end of the market.

[22] A cashmere commodity exchange that brings together herder associations or co-operatives and processors and allows the product to be supplied through both long-term contracts and auctions has been recommended (UNDP 2008: 62). The government appears to be aware of this option and one of the top priority projects listed by the National Development and Innovation Committee, an Agricultural Commodity Exchange, aims to create four regional wholesale centres where herders and farmers can sell agricultural products and raw materials directly to end users. Although the commodity exchange appears to be aimed at a range of products, the project description highlights its role in providing an adequate supply of cashmere to domestic processors, so cashmere is clearly the main product under the scheme.

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In 2009 there were over 56 factories with a processing capacity of 7,000 tons of raw cashmere, 4,500 tons of de-hairing, 1,120 tons of spinning, 1,200 thousand pieces of knitted cashmere garments, and 350,000 pieces of woven garments (Table 18).[23]

Table 18. Cashmere processing capacity by company

Company	Installed production capacity				
	Scouring (tons)	De-hairing (tons)	Spinning (tons)	Knitting (thousand pieces)	Weaving (thousand pieces)
Gobi Company	1,000	400	300	458	153
Buyan Holding	650	500	200	150	0
MCCWC	450	150	150	200	-
Mon-Forte LLC	300	300	35	-	-
Eermel LLC	250	150	150	150	150
Mon-Italy LLC	720	150	-		
Altai Cashmere LLC	240	100	-	50	-
Sor Cashmere LLC	300	90	70	-	-
Cashmere concept LLC	150	78	35		-
Tuya Company	300	50	-	-	-
Cashmere products LLC				100	-
Osin LLC	80	50	35		-
Blue Sky LLC	150	72	35		-
Sanshiro LLC	75	40	75	-	20
Erdenet cashmere LLC	100	-	35	-	-
Others	1,500	2,339	-	200	47
Total	**7,000**	**4,500**	**1,120**	**1,200**	**350**

Source: National Customs Statistics.

The demand for classic cashmere garments comes from the luxury segments of the European, United States and Japanese markets. Strongly influenced by fashion trends, the demand has periodic peaks, which is reflected in prices. On the international market, fine de-haired Chinese cashmere sells at a higher price than Mongolian cashmere because it has two technical advantages: i) it is slightly finer (1-2 microns difference); and ii) it is whiter, and therefore suitable for producing the pastel shades which dominate the women's knitwear market. Mongolian cashmere is used for the lower-value market of darker shades. On the other hand, the Mongolian cashmere fibre is 10-15 per cent longer than Chinese cashmere (a result of longer harsh winters); has a softer texture that both consumers and spinners recognize. Because of these characteristics, Mongolian cashmere is commonly blended with Chinese cashmere fibres; the mixture spins better and has an acceptable whiteness. This boosts the desirability and price of raw Mongolian cashmere, but also leads to alterations of the mixture, as many spinners are tempted to mix Mongolian cashmere with white fine wool.

Mongolian cashmere used to have a good international reputation. Its quality, however, has been deteriorating due to poor goat nutrition, which affects the fibre's distinctive characteristics. Table 19 shows the diameter, length and colour of cashmere fibre for Mongolia, China, Australia, Iran and Afghanistan. Mongolian cashmere fibre is better than Chinese cashmere in fibre thickness and length, but not in colour. The longer the length of cashmere, the better for processing knitted and woven products.

[23] It is important to highlight that since 2005 the number and volume of production of factories has been falling dramatically because of the cancellation of United States preferences for unlimited quantity and China's entry into the WTO.

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Table 19. Comparison of raw cashmere quality, 2009

Indicators	Mongolia	China	Australia	Iran	Afghanistan
Fibre (diameter/microns)	16.0-16.8	15.6	17.8	17.4	17.3
Length (mm)	40-45	32-38	21.5-34.7	21.4-38.8	20-23
Colour	60% / light	100% /white	Light/grey	Grey	Grey

Source: *National Workshop on Cashmere Industry, 2009.*

The finest cashmere comes from the Alashan plateau which stretches through China and Mongolia. China has implemented a series of agricultural programmes that provide herdsmen with training on improved care for cashmere goats with better nutrients and animal husbandry. They also learn about veterinary care, grazing techniques and combing to ensure the production of high-quality cashmere. China has conducted scientific research that has proved that healthier cashmere goats produce finer and longer cashmere.

Care and attention must take priority over speed and cost savings in the de-hairing, spinning and production processes. Experts at each of these stages must set high standards and be willing to ensure that products are reprocessed until they meet them. Quality control is important because a simple improvement early in the process can mean a significant improvement in the final product.

In the categories of cashmere products exported in 2009 (Table 17), Mongolia only used 15 per cent of all obtained raw cashmere for the production of finished products, 34 per cent of raw cashmere was used for semi-processing production (de-haired) and 51 per cent was exported to China without value added processing. In other words, 85 per cent of Mongolia's cashmere exports were either scoured or de-haired, and only 15 per cent was finished product. By contrast, China exported no unprocessed raw cashmere; 68 per cent of all collected raw cashmere was turned into finished products and 32 per cent was exported to other countries after semi-processing.

The Chinese cashmere business has made the leap from exporting the raw material to selling finished goods to the most prestigious brands in the fashion world. Its lower production costs turned cashmere from a luxury item into a mass market, high-street commodity. As China's main competitor, Mongolia should process more of its raw cashmere. For this to happen, Mongolia needs to increase its spinning capacity and manufacture its own yarn, rather than importing it from China.

ii) Sheep's wool

Mongolia has about 15 million sheep. The animal is farmed for its meat, wool, skin and milk. Mongolian breeds like Bayad, Altaian, Torguud, Darkhan, Uzemchin and Barga are classified by their unique characteristics. Three Mongolian scientists created the Orkhon and Yeruu breeds. The average weight of a Mongolian sheep is 50 kg and it gives around 1.5 kg of wool; the Orkhon breed weighs 75-85 kg, gives 7.5 kg of wool and is well-suited to the local climate. Mongolian sheep have adapted to a harsh climate and are able to survive drought, heat, shortages of grazing and water, and moving location. Other hybrids are unlikely to survive in such conditions. Foreign scientists have praised the skills and ability of Mongolian herders in developing such livestock.

Sheep's wool is an important basic material for high-quality woollen cloth and carpets. With sheep numbers down, global wool production fell in 2008 and 2009 and production is likely to be lower in 2010, particularly for apparel wool. The International Wool Textile Organization (IWTO) expected production to fall by around 2 per cent in the 2009/10 season. Sheep numbers continue to fall in some countries, notably Australia and China, as growers shift away from wool to meat production. There is also very little stock being held within the grower countries to add to the supply of wool.

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Apparel wool prices fell sharply in October 2008 as a result of fallout from the global financial crisis. Prices reached a low point in February 2009 before recovering a little by the end of the season. Trends in the prices for wool used for interior textiles were more mixed in 2008/09, but the overall decline was not as significant, in part because prices for interior textiles wool had not risen by as much as those for apparel wool in 2007/08. The average price for wool sold in New Zealand actually rose by 2 per cent in 2008/09, reflecting the relative importance of coarse wool in New Zealand's clip.

The larger fall in wool prices in part reflects the fact that they had risen more than those for other fibers in 2007/08 and had become less competitive, encouraging processors to use less wool in blends with synthetic fibers. This is indicated by the wool to synthetic and wool to cotton price ratios. The wool to synthetic prices ratio peaked at 4.3 in the first quarter of 2008, but had fallen back to 3.1 by the second quarter of 2009. Over the same period, the wool to cotton price ratio fell from 5.6 to 4.5.

Data from the International Trade Centre show that raw wool exports fell sharply in 2008. Exports from Australia, the world's largest exporter, fell by 13 per cent. Raw wool imports also recorded a sharp fall in 2008. Global trade in wool yarn, wool woven fabrics and wool apparel (knitwear and in men's and women's woven wear) also declined in 2008, as a result of both the lower raw wool supply and the slowdown in the global economy. The trend continued in 2009 and is likely to have persisted in 2010.

Considering these circumstances, Mongolia needs to explore alternative markets for the quantity and quality of wool that it is producing. One option could be to promote Mongolian wool as a natural insulation material.

iii) Camel

The Bactrian camel has become a symbol of Mongolia. Almost two-thirds of its camels are in the Gobi region.[24] It is an animal which is easy for herders to handle, is very hardy and is highly adapted to the desert environment. In the summer the hair is short and thin, and in the winter it grows long and thick, protecting the camels from the cold. Animals can be 3 metres high, weigh up to 700 kg and live as long as 40 years. They are important for herders as a source of milk, wool and transport – both for riding and to carry heavy loads when the herder family moves camp. The number of camels in Mongolia has declined dramatically in the past decades. In 2010 there were about 255,000 camels, which produce an estimated 700 tons of "female" wool a year.[25]

The international camel hair market is a solid niche market within the animal hair sector. Significant supplier countries of camel hair are: Mongolia, Iran, Afghanistan, Russia, China and Australia. The fine fur of camel hair is often blended with fine wool to create fabrics for men's and women's coats, jackets and blazers, skirts, sweaters, gloves, scarves, mufflers, caps and robes. The long coarser hair removed in the de-hairing process is also used for blankets, carpet backing and waterproof coats.

[24] Camels also play a vital role in the management of the Gobi. They forage on a type of shrub called saxaul (*Haloxylon ammondendron*), especially in the winter, and help maintain saxaul forests by spreading their seeds. Saxaul forests protect the soil from erosion, shelter other plant species from the biting wind, and help to retain moisture in the soil and air. However, saxaul wood is also a major source of fuel. Protecting and restoring saxaul forests is an important strategy to combat desertification.

[25] Government policy seeks to increase camel numbers by rewarding herders for larger herds and supporting exhibitions of camel products. The Gurvantes district government pays herders MNT1.000 (about US$0.70) for each new-born camel calf.

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There are five steps involved in the production of camel hair products: collection, sorting, de-hairing, spinning and weaving or knitting. After collecting the hair either through shearing or during the moulting season, it goes through a sorting process, separating the coarse hair from the fine and soft hair. The fibres are washed to remove any dirt or debris and the sorted and washed hair is then de-haired. This process removes the coarse hair and any dandruff or vegetable matter before it is sent to be spun into yarn and used for either weaving or knitting.

The quality of wool is determined by the age and sex of the camel. Mongolian herders distinguish "male" and "female" wool. The male wool is made up of longer, coarser hair; it comes from the mane, the front of the neck, the knee and the tops of the humps. Most is used to make ropes and animal halters. The long neck hair is used to make thread, and hair from the mane is used to make bags and as insulation in traditional quilted jackets. A camel yields about 1.5 kg of male wool a year. The finer wool, female, is from the rest of the body. A camel yields about 3.5 kg of female wool a year. The finest and most valuable is called *torom* wool and comes from baby camels less than three years old. The older a camel gets the less female fibre it has; 80 per cent of the wool from an adult camel is fine hair with a diameter of 17–20 microns.

The three biggest companies in Ulaanbaatar together process less than half of Mongolia's camel wool– about 310 tons a year. It appears that up to half of the raw wool suitable for making yarn and garments is not processed in Mongolia; it is either stored or smuggled over the border to Chinese factories.

Among the many problems that the camel hair industry faces are: lack of organization; the nomadic lifestyle of herders, long distances, high costs of travel and communication, a lack of infrastructure, as well as limited understanding of cooperation mechanisms; lack of export skills; inconsistent demand from traders; and lack of capital and credit.

With assistance from the European Union, the Mongolian government has established "Gobi desert camel wool" as a "geographical indication" – a kind of trademark that guarantees the origin of the wool (UNDP, 2008). This certification requires that all processing steps are done in Mongolia. Registered producers can use the geographical indication logo as well as their own trademarks.

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iv) Yak

Yaks are an indispensable part of animal husbandry in the high mountain regions where they are used both for transport and for their productive capabilities. In recent years, the textile industry has greatly increased its demand for yak fibre. The yak has a high degree of adaptation to the ecosystem. No other domestic animal can feed on the vegetation growing at 2,000-4,000 metres, in territory marked by steep, treacherous slopes, moorland, bogs and lakes. The morphological and physiological characteristics of the yak endow it with an ability to resist cold, to scrape through snow for fodder and to graze very short grass.

Though there is increasing demand for yak wool, Mongolian authorities have not done enough to improve the procurement system. Herders are not aware of the techniques of yak wool combing and sorting, and the majority use it for making household items (e.g. ropes).

Domestic processing factories have started producing high-quality products for both domestic and foreign markets. This has raised the demand for yak wool, but the supply has been relatively low. The international yak market is expected to have a bright future, because the wool is seen as an exotic fibre and fits into the recent revival of natural fibres. The fashion industry is looking for new and innovative fibres, with the potential for higher margins. The best example of this kind of development is vicuna fibre, sourced mainly in Peru. The demand for other exotic fibres, such as mohair and alpaca, is also increasing. Yak wool, which is warmer than sheep wool, might be the next natural fibre to be taken up by fashion designers.[26] The Food and Agricultural Organization (FAO) has run tests showing that yak wool is stronger but as thin and fine as merino wool.

4.2.2 Textiles

The textile industry accounts for 23 per cent of Mongolia's manufacturing sector. Mongolia should identify and target niche markets built on demand for natural fibres. The authentic design (i.e. Mongolian patterns) of the clothes it produces plays a crucial role. Also, garments with the traditional nomadic style (i.e. customs) need to be developed. Establishing its own style is crucial to position Mongolian natural fibre products in the international market.

Apart from garments, natural fibres could be used in other products, like carpets, felting, insulation material, etc. For example, there are two major carpet producers (one in Ulaanbaatar and one in Erdenet) and several blanket producers. Their production capacity for scouring, spinning, knitting, weaving and felt making is far in excess of current production. There is a potentially large market for machine-made carpets, especially in China, but also in other countries which are currently supplied by Belgium, Turkey and Egypt. In addition, there is a potentially large demand for hand-woven carpets presently supplied by Nepal, Pakistan and others.

4.3 Prospects for the Industry

Mongolia's natural fibres industry has the potential to gain a niche in the international market. In fact, there are already Mongolian companies which are developing the capacity to compete in the international market (see Appendix 1 for a list of the main companies). New companies require initial support from the government, such as preferential loans, temporary tax benefits, access to state-of-the-art manufacturing techniques, designs, machinery and materials required in the production process of natural fibres products, access to markets information, etc.

[26] Yak wool is gently brushed off rather than sheared (placating animal rights activists).

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In order for Mongolia's manufactured products to be competitive they need testing laboratories, equipment and labour that meet international standards. Government as well as the industry sector itself has to create and maintain such primary testing facilities, ensuring that they are in outstanding condition and fully equipped. They must be recognized by and registered with the relevant international bodies and agencies in order to assure international compliance. The laboratories need to be equipped at least with a scanning electron microscope, which is a standard device for differentiating cashmere fibre from other fibres.

Mongolian national research institutes contribute to the improvement of the quality of the industry. Although there are good institutes (e.g. the Textile Research Institute), they do not have the necessary level of expertise to do industry research. Currently, machines and instruments have to be bought to comply with current international standards. The institutes are also part of international networks and associations. The institutes are mostly or partially public owned, but their funding is insufficient. The Mongolian government needs to assure them of financial support.

Once the quality of the raw material is ensured, production of goods produced using natural fibres could be increased if the laborious cleaning and de-hairing process was mechanized. Women could continue to hand-spin at home. The possibility of establishing regional cooperatives could be examined. Marketing is the key to the future strategy for the Mongolian animal hair and textile industry. The following scenario concentrates on cashmere, but could also be applied to the other fibres, especially yak.[27]

As a long-term strategy, Mongolian cashmere has to create its own identity. Competition from Chinese cashmere producers and manufacturers will continue and become stronger, meaning that Mongolian cashmere will need its own identity to market it. A marketing concept has to be developed by an international marketing authority. The logo used to promote the products is of great importance, for example "Mongolian Cashmere Mark". Such a concept was tried some years ago, but without the necessary support from the whole industry and government bodies, so it did not bear fruit.

Mongolian natural fibres need an own-identity related to the country itself. The country is already associated with the natural fibres products. There is already a proposed slogan "Cashmere of Mongolia" to promote the image of the local industry. However, the brand requires a slogan to be advertised internationally, and a set of technical requirements which can be met only by Mongolian cashmere. A suggested slogan is "Mongolia–the Cashmere Country".

Erdenet, a carpet company, is a good example of what can be done. It is already participating in international trade fairs and positioning its name. The firm has applied for the Woolmark licence, which will give it more authority to claim its own brand. In contrast, domestic cashmere garment producers are still at the stage of developing their own branding, marketing and distribution channels and a niche luxury market, on their own or with partners.

The industry needs to be innovative. The products have to be distinctive and unique. To achieve this, the industry requires professional designers, trained in high-quality design schools and academies where designers can become acquainted with fashion trends in high-income countries. Consequently, the government and industry have jointly to support the start-up of such institutions (e.g. an International Chinggis Cashmere Design Institute). Private initiatives in the form of joint-ventures and the assistance of international development agencies are also options to be considered.

[27] A recent publication by UNIDO (2010) provides useful guidance on adding value to traditional products of regional origin.

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4.4 Summary

- Mongolia needs to find a way of bringing herders and manufacturers of natural fibres together. Communication between the two is fundamental to the understanding of the need to improve the quality of the raw material.
- Quality assurance has to be taken into account, as quality is the base of all the other suggested initiatives. Without guaranteeing a certain quality standard, the marketing measures will not work. The best way of improving cashmere quality is empowering the herders. Quality improvement and monitoring measures require improved infrastructure and high-class equipment for the national public testing laboratories
- Production of natural fibre products could be increased if the laborious cleaning and de-hairing processes were mechanized, although women could continue to hand-spin at home. The possibility of establishing regional cooperatives could be examined.
- Mongolia has to market and brand its products (and itself) strongly. Its unique environmental terrain, and traditional ambience and heritage give it a perfect base for "co-branding" all Mongolian products, both raw material and added-value products.
- The Marketing Strategy Approach has to be accompanied by a series of measures involving government and industry, to give support to producers of natural fibres products, through investing in infrastructure, establishing design schools, and equipping high-class testing laboratories and research institutes.
- A leading design institute for cashmere needs to be created in Mongolia. (e. g. an International Chinggis Cashmere Design Institute).
- A series of marketing measures needs to be executed, such as having stands/show cases at international fashion exhibitions (Premiere Vision/Texworld, Heimtextil fair, etc.); working with celebrities from Mongolia e.g. Galsan Tschinag; inviting fashion designers to Mongolia; and organizing a cashmere conference in Mongolia.

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Appendix 1. Main natural fibre companies

Carpets
Erdet Carpet Corporation
Ulaanbaatar Carpets JSC

Commission spinners
Buyan LLC

Consultancy services
Mongolian Textile Institute

Dehairers of cashmere/camel-hair
Buyan LLC
Cashmerefine Asia Co. Ltd.
Chono Corporation
Eermel Shareholding Co.
Erdent Cashmere Co.
Buyan LLC
Erdenet Carpet Corporation
Gobi Corporation
Mongol Cashmere & Camel Co.
Mongol Nekhmel (Montex) Co.
Monital Cashmere Co. Ltd.
Novanooluur LLC
Sor Cashmere Co, Ltd
Sun Shiroh Co. Ltd.
T & I JVC
T. Noosimpex Co. Ltd.
Tuya Co. Ltd.
Unitra Co. Ltd.
Western Sources Co., Bridge Group

Dyers (commission and/or on own account)
Buyan LLC
Erdenet Carpet Corporation
Sun Shiroh Co. Ltd.
Buyan LLC
Eermel Shareholding Co.
Erdenet Carpet Corporation
Gobi Corporation
Sun Shiroh Co. Ltd.
Ulaanbaatar Carpets JSC

Finishers (commission and/or on own account)
Buyan LLC
Eermel Shareholding Co.
Erdenet Cashmere Co. Ltd.
Gobi Corporation

Garment manufacturers
Buyan LLC
Eermel Shareholding Co.
Erdenet Cashmere Co. Ltd.
Ezlo Foradori LLC
Gobi Corporation
Khatan Suljee Co. Ltd.
Mongol Cashmere & Camel Co.
Sun Shiroh Co. Ltd.
Western Sources Co., Bridge Group

Knits (including knitted fabric)
Buyan LLC
Eermel Shareholding Co.
Erdenet Cashmere Co. Ltd.
Gobi Corporation
Sun Shiroh Co. Ltd.
Western Sources Co., Bridge Group

Laboratory and testingservices
Mongolian Textile Institute
T. Noosimpex Co. Ltd.

Merchants (wool)
Buyan LLC
Cashmerefine Asia Co. Ltd.
Chono Corporation
Erdenet Cashmere Co. Ltd.
Mongol Nekhmel (Montex) Co.
Monseal Co. Ltd.
T. Noosimpex Co. Ltd.
Unitra Co. Ltd.

Merchants (yarn)
Eermel Shareholding Co.
Erdenet Carpet Corporation
Erdenet Cashmere Co. Ltd.
Mongol Nekhmel (Montex) Co.
Sun Shiroh Co. Ltd.

Other fibre producers
Erdenet Cashmere Co. Ltd.

Reclaimed/recycled textiles and textile waste
Gobi Corporation

Scourers, carbonisers and blenders
Buyan LLC
Eermel Shareholding Co.
Erdenet Cashmere Co. Ltd.
Gobi Corporation
Mongol Nekhmel (Montex) Co.
Sun Shiroh Co. Ltd.
Tuya Co. Ltd.

Spinners (semi-worsted)
Eermel Shareholding Co.
Gobi Corporation

Spinners (woollen)
Buyan LLC
Eermel Shareholding Co.
Erdenet Carpet Corporation
Gobi Corporation
Mongol Nekhmel (Montex) Co.
Sun Shiroh Co. Ltd.
Ulaanbaatar Carpets JSC

Spinner (worsted)
Gobi Corporation

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Textile education/courses
Mongolian Textile Institute

Technical textiles (wool)
Unitra Co. Ltd.

Topmakers and combers (commission)
Cashmerefine Asia Co. Ltd.
Gobi Corporation
Mongol Nekhmel (Montex) Co.

Topmakers and combers (on own account)
Gobi Corporation
Mongol Nekhmel (Montex) Co.

Trade associations
Ministry of Industry and Trade
Mongolian Fibremark Society

Transport services/shippers/couriers
International Freight Forwarding Centre of Mongolian Railways (IFFC)
Mongol Trans Co. Ltd.
Mongolian Express Co. Ltd.
MMT – Mongolian Transport Team Co. Ltd.
Tuushin International Freight Forwarders

Weavers (labels)
Sun Shiroh Co. Ltd.

Weavers (woollen)
Eermel Shareholding Co.
Erdenet Cashmere Co. Ltd.
Gobi Corporation
Mongol Cashmere & Camel Co.
Sun Shiroh Co. Ltd.

Weavers (worsted)
Erdenet Cashmere Co. Ltd.
Gobi Corporation

Wool felts
Erdenet Carpet Corporation
Esgi, Esgi Gutal Co. Ltd.
Mon-Es Co. Ltd.

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5. The Red Meat Processing Industry

5.1 Introduction

This chapter discusses the current state of the red meat industry in Mongolia and suggests changes that need to be made in the organization of the industry, management of animals on farms and along the processing system. It emphasizes that the Mongolian meat industry needs to move away from being almost entirely "production-focused" to become "consumer-focused".

Mongolia is in competition with a number of meat exporting countries that over the past 50 years have developed meat industries that comply with international meat trading standards for product management in hygiene, processing, packaging and presentation. In order to become internationally competitive, Mongolia must emulate the meat processing systems of competing countries and follow international safety standards. According to experts, the Australian meat industry is the best model for Mongolia to study, as there are many similarities between the two countries. The developmental stages through which Mongolia must pass in order to compete in international meat markets have been traversed by other countries which are now well-positioned in international markets. As the general level of profitability, hygiene, management and red meat production efficiency at which the Mongolian industry is operating is currently very low by world standards, it is expected that it will take Mongolia many years to become competitive in international markets.

The Mongolian meat industry is a meat production and selling system and not an integrated meat industry of the kind normally seen in international marketing systems. Compared with major meat-exporting countries, Mongolia has a non-integrated, segmented supply chain, with no co-ordinated strategy. Businesses along the Mongolian meat supply chain appear to consider their individual interests only and not the interests of the whole supply chain. Nor is the Mongolian Herders Association representative of all herders although, with the assistance of the Green Gold initiative of the Swiss Development Corporation, its influence is apparently growing. Not all herders contribute financially to this Association and therefore they do not consider it a representative organisation.

The Mongolian Government has enacted many resolutions for the meat industry, but these are "top down" dictates and not necessarily accepted by the whole industry. Most of measures needed to improve the Mongolian meat industry have been proposed by national and international specialists over the past 20 years. However, the one issue that has not been adequately addressed is the development of a cohesive, self-reliant, world standard industry, which operates independently of, but in partnership with, the Government. The private sector must form associations, share information and work collectively to make the industry consumer-focused and thus successful (van Gelder, 2010).

The Mongolian population consumes approximately 85-95 per cent of all meat produced in the country. Most of this meat comes from animals slaughtered outside the abattoir system. The Mongolian population prefers to prepare meat by traditional wet-cooking methods. By international food preparation standards, such cooking methods are uncomplicated and do not demand differentiation of meat on the basis of tenderness, colour, age, sex, fat marbling, etc. All cuts of the animal carcass are sold for the same price, or for very slight price differences, and there is no consumer demand or pressure for price differentials.. This has translated into a single price per kg paid to herders for animals of different quality. Herders increase their incomes either by selling more or bigger animals. They do not pay attention to animal quality, based on objective, measured specifications, as occurs in developed international meat trading nations.

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The Mongolian constitution states that the land belongs to the State, so the herders cannot own, or lease, the land on which they graze their animals. Herders increase their livestock numbers in order to survive economically. This has led to 71 per cent of the land being subject to some form of degradation and desertification and a lack of meat producing ability in Mongolian animals. In order to improve the herders' husbandry, a marketing and ownership system that leads them towards increased profits must be created. Van Gelder and Erdenebaatar (2007) comment that:

> "It seems that the problems in Mongolia are that herders are concentrating on least-cost inputs and do not have any understanding of the possible production benefits that may accrue from high quality production methodologies (such as the use of veterinary services and vaccines, drenches, dips etc.), because they have not had the opportunity to see what can be done, or have it explained to them. There is no information exchange, no media advertising and no encouragement. The changers [traders] are the people who spread information to the herders and they naturally will spread information that serves their individual commercial purposes and this has certainly not been to the long-term benefit of Mongolia."

5.2 World Meat Market Situation and Mongolia's Supply Capacity

Mongolia currently faces a problem of overproduction of meat due to an increase in the domestic animal population. The effect of the 2009-2010 *dzud* (a Mongolian term for an extremely cold winter when large numbers of livestock die from starvation) on meat production has not been fully assessed. The Mongolian Meat Association estimates that the maximum amount of meat Mongolia may have to export in 2010 is 111,400 tons, made up of 89,000 tons of goat meat (largely from older male and male castrate goats), 10,000 tons of horse meat, 10,000 tons of beef and 2,400 tons of sheep meat. The price for exported Mongolian meat is about US$1.00/kg, which is three to four times lower than the price received by Australian meat exporters, depending on the type of meat (e.g. goat, beef, mutton, etc.).

According to world meat trading estimates by the FAO this amount of meat should easily be absorbed into the world trading system. However, there are production difficulties and food safety issues to be resolved before export of meat can be successfully engaged in.

According to the latest available estimates for 2010 by the Food and Agricultural Organization (FAO), world production of meat will be approximately 283 million tons. Mongolia's contribution to world meat exports is very small (0.5 per cent).

The top ten producers of bovine meat are China, the United States, Brazil, India, Russia, Canada, Argentina, Australia, Japan and the Republic of Korea. However, the ranking of the countries changes when exports are taken into account. The top ten exporters are the United States, Brazil, Canada, Australia, New Zealand, China, Argentina, India, Republic of Korea and Ukraine (see Table 20). China, India and Australia are the top three producers of sheep and goat meat; while New Zealand, Australia and Mongolia are the top three exporters.

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Table 20. World meat estimates for 2010

TOTAL MEAT	Production (tons)	Consumption (tons)	Imports (tons)	Exports (tons)
World	282,600,000	282,500,000	21,331,700	21,386,400
Mongolia	**334,400**	**223,000**	**unknown**	**114,400**
Bovine meat				
World	67,700,000	67,700,000	6,677,400	6,679,200
United States	12,000,000	12,000,000	1,250,000	1,298,000
Western Europe	8,500,000	8,100,000	417,000	792,300
Brazil	8,400,000	7,500,000	66,300	916,000
China Mainland	7,300,000	7,300,000	0	25,300
Africa	4,600,000	4,900,000	353,700	78,600
India	3,500,000	3,100,000	200	347,700
Argentina	2,900,000	2,600,000	22,300	318,800
Australia	2,000,000	900,000	4,500	1,122,900
Russian Federation	1,900,000	2,700,000	860,900	4,700
Canada	1,300,000	1,100,000	269,000	556,100
Ukraine	900,000	800,000	1,500	137,200
New Zealand	700,000	200,000	6,700	495,400
Japan	500,000	1,600,000	1,106,300	700
Kazakhstan	400,000	300,000	6,500	17,400
Republic of Korea	300,000	600,000	391,200	1,200
Mongolia (Cattle, Horse, Camel)	**84,400**	**64,400**	**unknown**	**20,000**
Sheep and goat meat				
World	13,700,000	13,700,000	833,900	834,200
China Mainland	3,500,000	800,000	1,700	0
Africa	2,200,000	2,200,000	27,300	18,800
Western Europe	1,100,000	1,400,000	240,100	5,200
India	800,000	800,000	0	18,400
Australia	700,000	400,000	300,000	338,400
New Zealand	600,000	200,000	3,200	381,200
Russian Federation	200,000	200,000	10,000	100
Mongolia	**138,600**	**47,200**	**unknown**	**91,400**
Argentina	100,000	100,000	600	1,400
Brazil	100,000	100,000	5,400	100
United States	100,000	200,000	80,200	2,700
Kazakhstan	100,000	100,00	0	2,000
Republic of Korea	0	0	11,200	3,000
Canada	0	0	16,100	400
Japan	0	0	37,100	0
Ukraine	0	0	1,900	300

Source: FAO.

Mongolia has to assess its meat production capability and the characteristics of its meat. Mongolia produces fat-tailed or fat-rumped sheep which Australia and New Zealand do not. This automatically gives Mongolia an advantage in countries which prefer fat-rumped sheep, for example countries in the Middle East.

Mongolian exports of meat are largely to long-term traditional markets in Russia, with minor trade in meat or live animals to some Middle Eastern countries, China, Japan and the Republic of Korea. The monetary value of Mongolian meat exports is currently small (approximately 1.3 per cent of GDP in 2009).

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5.3 The Mongolian Meat Processing Industry

The Mongolian meat industry is seeking to enter the international meat trade and to add value to its meat through processing it. Adding value to meat, as seen in meat exporting, is mainly through sectioning and packaging the animal carcass into individual cuts which suit the needs of retailers.[28] This requires a number of co-ordinated activities beginning with animal production and ending with delivery of the final product to the final consumer.

On the farm or in the pasture/rangeland, it is important to stimulate a continual increase in animal production through improved animal genetics, feeding regimes, health procedures and animal welfare. These activities must become accepted as "Codes of Practice" applied by all animal producers/herders. It is imperative that a trace-back system for each animal, or group of animals from one farm or area, is implemented, so that problems further along the market supply chain can (if necessary) be traced back to the individual farm or herder. This is within Mongolia's capability, but objective judgements will have to be made about all components of the current meat supply chain from on-farm production to handling, transport, animal slaughter, selling and marketing systems.

While Mongolian and international specialists have made many useful proposals to improve the industry over the past 20 years, the one issue that has not been adequately addressed is the development of a cohesive, self-reliant meat industry, which operates independently of, but in partnership with, the Government, as in successful meat-exporting countries. In this regard, the Mongolian Government should consider passing legislation granting land rights to herders. A form of land rights for individual herders or associations of herders based on regions of common usage would modernize the herding industry.

5.3.1 The Mongolian Meat Market and Production

The domestic meat market is the controlling factor for Mongolian meat production. Mongolians prefer traditionally killed meat, and due to its limited spending power the Mongolian population places downward pressure on meat prices changes. Between 85 per cent and 95 per cent of Mongolia's annual meat production is consumed domestically.

Red meat in Mongolia is produced from sheep, goats, cattle, yak, horses and camels. There has been a dramatic increase in goat numbers in comparison with other livestock, although overall livestock numbers have doubled since 1985. Some commentators suggest that the increase in animal numbers is an indication of the success of the market economy concept. Many other commentators express concern that the country is not capable of supporting this number of livestock, when the long winters, the very short plant growing season and the need to produce animal products (meat and fibre) that will be acceptable in both the international and domestic markets are all taken into account.

Technical studies need to be made of: (i) pasture production capability in the various ecological regions of Mongolia, to support animals based on the 100-120 day pasture plant growing season; (ii) the number and distribution of watering points to service the animals; (iii) the availability of winter-saved pasture and hay to service animal requirements in the periodic and inevitable *dzud*, which naturally occur in cycles of approximately 10-12 years.

Mongolia's total annual meat production in 2009 was approximately 245,000 tons from the slaughter of 8.2 million livestock. Domestic consumption is approximately 229,000 tons (Enkh-Amgalan, 2010).

[28] Adding value for the domestic market in developed economies takes the following forms: adding extra ingredients to the raw meat; cooking the raw meat before sale, as with pre-cooked roasts; processing meat into small goods; prepared sausages; packaging meat for a longer shelf life.

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Table 21 provides the production figures for beef, horse, sheep mutton, goat and camel. In 2009, approximately 10,000-20,000 tons of meat were exported to Russia and about 241 tons to the Middle East, Japan and the Republic of Korea. Exports of meat are projected to increase in coming years, presumably to the Middle East. 20,000 tons of sheep meat and 20,000 tons goat meat are expected to be exported through Tianjin in China, which is the closest port to land-locked Mongolia. It is planned to establish a 3,000 ton, cold-storage facility in Tianjin. However, it will be necessary for the Mongolian Government to negotiate with the Chinese Government for this to take place.

Table 21. Livestock numbers in various years and recent meat production

	1985	1989	1999	2007	2009
Total Number of Livestock	22,485,500	24,674,900	33,568,900	40,263,800	43,657,100
Livestock Consumed for meat	7,323,200	7,583,500	8,743,900	7,012,600	8,285,200
Total Meat Production (tons)	225,900	239,600	289,000	223,100	245,000
Beef	68,100	72,800	104,600	46,600	60,000
Horse	29,500			29,000	38,000
Sheep mutton	96,900	121,900	128,900	68,400	97,000
Goat	19,300			38,600	50,000
Camel	9,700			5,300	
Meat Processed through Abattoirs (tons)	62,500	61,700	4,300	6,800	18,300
Exported Meat (tons)	36,800	30,500	15,000	10,900	16,050

Source: Mongolian Statistical Handbook; Mongolian Meat Association (2010).

Box 7 lists the distinctive characteristics of the red meat industry in Mongolia.

Box 7. Distinctive characteristics of the red meat industry in Mongolia

- The population consumes 85-95 per cent of annual meat production.
- The average meat consumption of the population has been approximately 75-85 kg/per capita/year, which is among the highest in the world.
- Cooking methods traditionally employed do not stimulate price differentials for different parts of meat carcasses, thus reducing the possibility of value adding in the domestic market.
- Unofficially meat prices have been kept as low as possible, particularly in the spring, so all Mongolian people can purchase sufficient meat for household consumption.
- The profit margins in the Mongolian meat supply chain are not sufficient to allow any traders/abattoirs to invest in infrastructure improvements.
- The cost of developmental and operational finance for businesses makes borrowing for infrastructural improvements along the meat market supply chain uneconomic.
- Herders do not have funds to invest in animal improvements, health or feed, so animals are dependent almost solely on seasonal pasture.

The Mongolian Government approved the National Programme on Food Security by Resolution No.32, February 2009. Phase 1 of this programme is to be implemented between 2009 and 2012, and Phase 2 will be undertaken in 2013 to 2016. This programme is intended to: i) formulate and implement a meat sub-programme of support to intensified meat farms, meat processing facilities and meat exporters; ii) establish comprehensive agriculture and food production complexes, which comply with international standards; and iii) increase exports by producing healthy and safe meat and meat products and improving processing to meet international standards, i.e. applying HACCP (a quality assurance programme) and international standards such as ISO9001, ISO22000:207 in meat processing.

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At present Mongolia has 32 abattoirs, principally located in the north. Most of these abattoirs were built during the command economy period, with assistance from Russia, East and West Germany, Hungary, Bulgaria, Finland, the United Kingdom, Denmark and Yugoslavia, and are of old design. Together the abattoirs have an annual slaughter capacity of 85,000 tons of meat, and cold storage capacity of 42,000 tons. After transition to the market economy in the 1989-1991 period, privatization was undertaken, but difficulties arose. Lack of capital and operational finance forced the closure of many of the abattoirs.

The European Union Animal Health and Livestock Marketing Project (Leach *et al*, 2008; European Union, 2007) is addressing the issue of abattoir capability in supplying international markets and also the hygiene standards for supplying the domestic meat market. Some older abattoirs have been renovated and a small number of new ones have been established. The new abattoirs are privately-owned and have targeted specific markets, particularly the Republic of Korea.

Table 22 summarizes the total amount of meat produced in selected years, killed in small and large abattoirs, killed in non-abattoir locations, consumed domestically and exported.[29] Traditionally the majority of meat consumed in Mongolia has come from meat killed through non-abattoir processes. Since the mid-1990s there has been an increasing proportion of meat coming through non-controlled processes; animal health treatments are virtually unused by herders.

Table 22. Meat production and consumption in Mongolia (thousand tons)

Item	1989	1999	2009
Total Meat Production Mongolia	239.6	289.0	245.0
Slaughtered in Abattoirs	61.7	4.3	12.2*
(%)	25.8%	1.5%	5.0%
Slaughtered by non-abattoir processes	177.9	284.7	232.8
(%)	74.2%	98.5%	95.0%
Domestic Meat Consumption	209.1	274.0	223.0
(%)	87.3%	94.8%	91.0%
Total Meat Exported	30.5	15.0	22.0*
(%)	12.7%	5.2%	9.0%

Note: *Preliminary figures.

Source: van Gelder (2010: Table 8).

To bring about change, whether to improve the quality of meat for domestic consumers or to break into international market niches, the Mongolian meat industry will have to improve the way it operates.

[29] Appendix 2 lists the operational abattoirs in Mongolia and indicates that the major player in the Mongolian domestic and international trading scene is the Just Group LLC, with approximately 30-50 per cent of production capacity.

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5.3.2 The Quality of Red Meat

Many studies have been undertaken of herders and their livelihoods. However, virtually no studies have been done on farm management costs and returns applicable to herder activities (Bat-Erdene, 2004). Until full trials have been carried out, using adequate quality supplementary feedstuffs, it is difficult to gauge whether Mongolian animals could satisfy quality specifications for meat to compete on international markets.

Currently there are concerns about the fact that Mongolia has approximately 45 million head of livestock. Emergency measures are being undertaken to allocate an adequate emergency store of variable quality fodder (mostly high crude fibre/low crude protein) to starving animals. The increase in animal numbers has come mainly from a vast increase in the goat population, due to the herders' quest for increased incomes from goat fibre.[30] The number of large animals (cattle, camel, horse and yak) has remained low since the 1999-2000 *dzud* (Leach *et al.*, 2008; European Union, 2007).

Meat production by any animal depends on a number of factors: the genetics and selection of the animal; the nutritional environment to which the animal is exposed—in Mongolia there is only one period of the year (usually mid-summer and early-autumn) when pasture feed is usually abundant, therefore the main selling and slaughter season is from September to December/January; climate stresses (of heat and cold); the animal experiences; and the disease and parasitic burdens the animal may carry. In intensive animal production the psychic reaction of an animal to its surroundings may also have a bearing on the animal's production through overcrowding.

5.4 The Mongolian Meat Processing Industry

5.4.1 Meat Pricing in the Domestic Market

A major disincentive for change for herders in Mongolia over the past 20 years has been the single price paid for meat from red meat producing animals; for example, a fat cow will receive approximately the same price per kg live-weight as a lean one. Mongolian herders do not perceive that there is any profit from contributing increased labour, managerial effort and production costs to produce meat animals that are of superior specifications and which may suit higher-priced international markets. International markets pay premium prices for different muscle bundles from different positions on the carcass. The price per kg can also vary depending on the type of cooking methods to be used. If meat is minced, heavily steamed or deep-fried, there may not be much difference between the different muscles. However, when western methods of cooking are applied the quality specification differences in muscles make a difference. It is for this difference that varying prices are paid for different cuts of meat in international markets.

One way to differentiate prices paid for meat products in Mongolia is to establish a number of animal feedlots (preferably for beef cattle) for intensive animal feeding. The meat products produced in these feedlots, if modern feeding and breeding methods are implemented according to international animal-feeding and husbandry standards, should be promoted to the hotel and restaurant trade in Ulaanbaatar and other major Mongolian cities, as well as to expatriates working in mining. It is in these niche markets that people will be willing to pay extra for quality. Once price differentials are achieved, the news will quickly spread. Herders are sure to begin to follow the pattern of development and change will occur.

[30] A major concern for international observers, environmentalists and no doubt the Mongolian Government has been the extreme build up in total numbers of the Mongolian national herd. Considerable commentary has been given to the carrying capacity of Mongolian pastures, but it has concentrated on the possibility of increasing desertification and the environmental destruction of flora and native fauna.

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5.4.2 Market Price Comparisons for Meat in Mongolia and Australia

Mongolian international traders have to seize the opportunity to create price differentials and encourage product differentiation by herders to satisfy different consumers, in order to open international niche markets. This section compares the price of red meat in Mongolia and Australia. Australia has been chosen as a comparator due to common characteristics of the two countries: dry climates in both countries have created herding industries based on domestic ruminant animals; both countries are becoming dependent on mining; and both countries have relatively small populations However, Australia exports red meat to over 100 international destinations; it is already well-positioned in international markets. Production and processing systems have been carefully developed to ensure that all international customers are satisfied. Therefore, Australia is possibly the main competitor that Mongolia faces as it tries to enter the international higher-value meat market.

Mongolian meat traders make small profits. The only way in which a trader can increase profits, based on the current meat industry system, is to gain a bigger share of the market. However, the herders are spread across Mongolia and the road transport system is not well developed for collecting and moving livestock or meat over long distances in a fast and efficient manner. Modern refrigerated trucks, capable of hygienically transporting a perishable product, such as meat, are not in evidence.

Table 23 indicates that the margin per kg for both beef and mutton carcasses, between the wholesale and retail prices, is on average MNT 1,050-1,200/kg (approximately US$ 0.80). However, this does not include costs associated with transport, slaughter, wholesaling of the meat, or paying financial interest charges on operational business costs, or capital investment costs. The estimated profits are certainly not sufficient to allow traders, or trading companies, to borrow money to invest in industry improvements.

Table 23. Margin per kg from Mongolian meat trading

Animal Species	Animal Live-weight kg	Live-weight Tg/kg	Average Live Animal Price Tg	Average Live Animal Price US$	PriceTg/kg Carcass Meat	Average Retail Price Tg/kg	Margin Tg/kg
Beef	181-250(215)	550	118,250	84.46	1,100	2,300	1,200
	251-320(285)	650	185,250	132.32	1,250	2,300	1,050
	321 plus(340)	700	238,000	170.00	1,296	2,300	1,004
Sheep	40-49(45)	550	24,750	17.68	1,146	2,300	1,154
	50 plus(55)	600	33,000	23.57	1,250	2,300	1,050

Source: van Gelder (2010: Table 2).

By comparison, the meat trade in Australia and other Western economies has certain characteristics which make managing profit margins easier. Although high profits are not being made in the Australian meat industry, the structure and the pricing system do reward good management. Table 24 indicates the margins in the Australian meat market. They are not large and processors have to maintain high levels of throughput and business efficiency to accumulate profits. The Australian population (approximately 22 million) allows market segmentation, specialization and the targeting of niche markets. The cultural mix provides an excellent base for researching what international meat markets require. This diversification does not appear to exist in Mongolia.

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Table 24. Australian wholesale and retail values and retail margins

Animal Species	Animal Live-weight (kg)	Live-weight Price AU$/kg	Average Live Animal Value AU$	Average Live Animal Value US$	Price AU$/kg Carcass Meat $/kg	Average retail Price AU$/kg	Margin AU$/kg
Beef	Average 240	1.86	446.0	410.3	6.8	10.3	3.5
	Average 365	1.90	693.5	638.0	6.8	10.3	3.5
	Average 450	1.72	774.0	712.1	6.8	10.3	3.5
Sheep	Average 31	2.93	91.0	83.7	4.5	12.2	7.5
	Average 42	2.55	107.0	98.4	4.5	12.2	7.7
	Average 55	2.40	132.0	121.4	4.5	12.2	7.7

Source: van Gelder (2010: Table 3).

Table 25 provides information on wholesale and retail prices in Australia. It shows that there are considerable differences in retail prices for different meat cuts. These cuts are used in different ways in food preparation in Australian households and restaurants. Value is placed on meat colour, tenderness, texture, fat content and fat colour. Value is also placed on the ease of cooking and the use to which the meat can be put in the preparation of a whole meal.

Table 25. Australian domestic beef (values for half carcass)

Australian Domestic Beef Cuts	Half carcass Weight Kg	% Half Carcass	Carcass Wholesale Price (AU$6.80/kg)	Carcass Retail (Price/kg)	Value of Domestic Beef Cuts AU$
Rump	3.52	4.1	23.90	23.99	84.32
T-Bone	3.54	4.1	24.04	24.99	88.34
Sirloin	3.29	3.8	22.34	18.96	62.28
Round	3.60	4.2	24.48	14.99	53.96
Topside	4.56	5.3	31.01	13.99	63.79
Butt Fillet	0.64	0.7	4.35	29.99	19.19
Silverside	4.60	5.4	31.28	16.99	78.15
Skirt	0.72	0.8	4.90	10.99	7.91
Kidney	0.27	0.3	1.84	4.99	1.35
Brisket	2.72	3.2	18.50	9.99	27.17
Blade	2.01	2.3	13.63	12.99	26.04
Y-Bone	2.85	3.3	19.41	8.99	25.66
Chuck	5.04	5.9	34.27	8.98	45.26
Rib Plate	2.38	2.8	16.18	4.00	9.52
Gravy Beef	3.89	4.5	26.46	7.98	31.05
Rib Fillet	2.1	2.5	14.28	37.99	79.78
Beef Mince	2.3	2.7	15.64	5.94	13.66
Lean Mince	10.35	12.1	70.35	8.99	93.00
Fat	10.48	12.2	71.26	0.14	1.47
Bone	15.71	18.3	106.83	3.99	62.68
Loss	1.09	1.3	7.41	4.36	4.75
Totals	85.64	100.0	582.35		879.36
Australian Domestic Lamb (Half Carcass or Side of Lamb)					
Australian Domestic Lamb Cuts	**Half (Side) Carcass Weight Kg**	**% Half (Side) Carcass**	**Half Carcass Wholesale Price AU$4.50/kg**	**Carcass Retail Price/kg**	**Retail Value of Australian Lamb AU$**
Leg Chump on	3.6	32.7	16.20	12.99	46.76
Rack	1.1	10.0	4.95	29.99	32.99
Short Loin	1.3	11.8	5.85	14.99	19.49
Shoulder	2.3	20.9	10.35	8.49	19.53
Neck	0.8	7.3	3.60	5.49	4.39
Foreshank	0.6	5.5	2.70	9.49	5.69
Breast and Flap	1.3	11.8	5.85	4.49	5.84
Total	11.0	100.0	49.50		134.69

Note: Retail prices obtained from Supermarket, 27 April 2010, Morayfield Qld, Australia.
Source: van Gelder (2010).

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Because Australia exports a large proportion of its meat (62 per cent of total production of 236,000 tons of mutton; 38 per cent of the 428,000 tons of lamb it produces; and 42 per cent of the 2 million tons of its beef and veal output) the domestic prices paid for Australian meat are closely allied to the meat prices obtained by exporters in international markets.

5.4.3 Limitations on Developing the Mongolian Meat Processing Industry

In studying the current dynamics of the red meat industry, several problems have been identified, which are preventing Mongolia from competing successfully in international markets:

- An underdeveloped financial system that prevents entrepreneurship by limiting access to long-term funds (see Chapter 2);
- The inability of entrepreneurs to borrow funds to upgrade abattoirs and accept the Hazard Analysis Critical Control Point (HACCP), a quality assurance programme;
- Mongolian land laws prevent herders from owning land, and they therefore do not accept responsibility for rangeland use. The government could opt for fixed periods of land-leasing arrangements (see Fernandez-Gimenez and Khishigbayar, 2006);
- The single price paid for meat products irrespective of quality specifications;
- Inappropriate meat handling from the point of slaughter to the retail market. There is no regulated sanitary system in place;
- Insufficient veterinary services because of the poor remuneration currently received by vets;
- A shortage of individuals who understand the differences in meat quality specifications for higher priced international markets.

Each of these limitations could be overcome. They are discussed in the following section.

5.5 Policies to Improve the Meat Processing Industry

There are many specific requirements to be addressed if Mongolia is to become competitive in the world meat market. The country needs to provide a strong institutional framework for the industry to flourish. Two separate organizations to reorganize the Mongolian meat industry are suggested. The first organization could be called the Mongolian Meat Industry Board (MMIB). The MMIB would represent all the organizations associated with the Mongolian meat industry so that the Government would only need to negotiate with and receive information from one organization. The MMIB would be directly responsible to the Minister of Food and Agriculture and Light Industry. Under the MMIB would be established the Mongolian Meat Administrative Body (MMAB). The long-term objective of the MMAB would be to administer the daily operation of issues related to the Mongolian meat industry and also to pass on international meat-industry skills to Mongolian people, so that Mongolia can work towards engaging in international meat trading.

The structure and nature of the MMIB and MMAB would need to be debated. However, they should be largely independent of the Government in their activities, decision making and budget allocations. It is suggested that an international Chief Administrative Officer of the MMAB be appointed for five years. This person should be a highly qualified international meat industry person. At an appropriate time the MMIB would facilitate a transition from an International Chief Administrative Officer to a Mongolian Chief Administrative Officer. The Chief Administrative Officer would have the power to

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employ other international personnel, to train Mongolian counterparts in areas such as: meat specification; HACCP systems; meat industry financial planning and management; abattoir design and management; international butchery methods; meat presentation and packaging for domestic and international markets; meat product manufacture; industry organization; international meat trading methodology and research; international niche market research and identification; international market research and business management; domestic market research and business management; animal breeding, health, management and feeding; feed-lotting and intensive ruminant animal management; the structure and design of intensive ruminant housing and yard design; and other matters necessary to achieve the policy objectives.

Financing for the MMIB and MMAB would come from three sources: (i) the Government, (ii) the Mongolian meat industry, through levies, and (iii) from multilateral or bilateral donors. The finances should be independent of the Government, should be audited regularly by a certified accounting practice, and regular accounting statements should be provided to the Government and the industry. Total transparency is essential.

Below we outline 12 steps which we consider would make a major contribution to developing the Mongolian meat industry in the direction of export standard production. These steps do not cover all aspects of what the Mongolian meat industry requires, but they are considered to be the issues which should to be given priority. They are not listed in order of importance, because the implementation of each will involve different time frames.

The steps are as follows:

- *Establish a financially independent meat industry able to negotiate with the Government with a single authoritative voice*. All stakeholders should take responsibility for their own operations, education and standards.

- *Stimulate price differentials for Mongolian meat products*. An international butcher, who could work for the Mongolian Meat Administrative Body (MMAB), should teach local butchers how to cut up a carcass and extract the superior cuts that would be attractive for foreign consumers.

- *Gain an understanding of the costs of meat production along the meat market supply chain*. Attention would be paid to the quality of inputs necessary along the meat processing chain to charge a price that would be linked to the quality of the meat.

- *Upgrade one centrally-located abattoir to supervise HACCP standards.* International meat markets have very high hygienic, packaging and presentation specifications, which have to be fulfilled by those wishing to have access to them.

- *Ensure that Mongolian meat for export is slaughtered in official abattoirs.* All meat for human consumption should be slaughtered under hygienic conditions and according to internationally-accepted hygiene and animal welfare standards.

- *Introduce leasehold ownership of land to stimulate herder land responsibility*. This step would encourage herders to look after the pastures, which will stop the desertification of the grassland. This action will increase the quality of animals.

- *Make the use of veterinary drugs mandatory*. International health standards require that animals are cleared of any disease; if they are not, animal products are banned from entry.

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- *Increase knowledge and labour skills of personnel in modern meat industry technology and world best practice*. Knowledge, technical expertise in physical operations, communications methodology and market supply chain co-ordination are all critical for the smooth and competitive operation of a meat industry. The Australian meat industry also recently established a new Meat Industry Strategic Plan, which addresses many of the issues that the Mongolian meat industry should also address. The Australian organization, Meat and Livestock Australia, has a most informative website, which shares information on many of these issues.

- *Develop an industry communications system for efficient market pricing and technical knowledge*. To avoid information bottlenecks each contributor along the meat supply chain must have access to accurate and reliable information.

5.6 Summary

- The current meat processing industry in Mongolia does not conform to international standards of production, or to the food safety requirements of importing countries. It will take time for Mongolia to achieve the organization, production and food safety standards necessary to participate fully in the international red meat market.
- The Mongolian private sector must form associations, share information and collectively work towards becoming consumer focused. The country also needs to provide a strong institutional framework for the industry to flourish; a Mongolian Meat Industry Board (MMIB) and a Mongolian Meat Administrative Body (MMAB) are suggested.
- The red meat industry is also characterized by there being no consumer demand or pressure for price differentials for different muscles in the animal carcass. This has translated into a single price per kilogram paid to herders for animals of a wide range of quality. Herders increase their income by selling more or bigger animals not by paying attention to animal quality, as in developed international meat trading nations. This price structure has to change. Herders need to receive price incentives to care for the quality of the animals.
- Mongolia could adopt and adapt the measures used in the Australian meat industry to improve the process of production, handling, publicity and communications systems.
- A number of steps are suggested, which could lead Mongolia to achieve trading capability in the international higher priced red meat markets.

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Appendix 2. Abattoir capacity in Mongolia, 2010

No.	Location	Companies	Capacity/Daily			Hanging Capacity Tonnage	Refrigeration Capacity Tonnage	Conservation Capacity	Tested by Laboratory or Not	Production for Export or Not
			Carcass Meat	Big Cattle	Small Cattle					
1	Akhangai	Hangai Huns LLC Taij Trade	40	200	800			500	Yes	Licensed
2	Bayan Uglii	**Just LLC** Bayan Uglii Meat Market	18	80	400			600		Under consideration
3		ET Transit	40	150	1200	15	22	500		Licensed
4		Zeger LLC	10	70			8	150		Licensed
5	Bulgan Hutag-Undur	***Just Agro LLC*** Bulgan Meat Market Factory	15	80	200	15	15	500		Under consideration
6	Darkhan-Uul	Darkhan Expo LC	65	240	2000		80	3000	Yes	Licensed
7		Tenger Trade LC	35	200	500			1000	Yes	Licensed
8	Dornod	***Just Agro LLC***	65	240	2000		50	3000	Yes	Licensed
9	Zavkhan	Ulaistai LLC	35	120	1000			500	Yes	Under consideration
10		***Just Group LLC*** Zavkhan Meat Market Factory	10	80			15	300		Licensed
11	Orkhon	GOKs Meat Factory	3	20				50	Yes	Licensed
12		Erdenet Progress LLC	40	200	800		45	1000	Yes	Licensed
13		Mongema LLC	45	200	1000	36	36	1000	Yes	Licensed
14	Uvurhangai	Har Horin Meat LLC	15	60	250			500		
15	Uvs	Uvs Meat Market Factory	15	80	200	100	100	250		Under consideration
16		Bumnomin LLC	10	30	200	5	50	50		Licensed
17		Mon-Tuva LLC	10	30	200	10	10	120		Licensed
18	Sukhbaatar	***Just Group LLC*** Meat Market	15	80	250			500		Licensed
19	Selenge	***Just Group LLC*** Slot hole, initial process factory	45	200	1000		50	500	Yes	Licensed
20		Gatsuurt LLC	20	100	200	52		170		
21	Khovd	Baruun Mongol	20	100	300			500		Under

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No.	Location	Companies	Capacity/Daily			Hanging Capacity Tonnage	Refrigeration Capacity Tonnage	Conservation Capacity	Tested by Laboratory or Not	Production for Export or Not
			Carcass Meat	Big Cattle	Small Cattle					
		International LLC								consideration
22	Khovsgol	***Just Group LLC***	40	200	800	24	40	1000	Yes	Licensed
23	Khentii	Meat Export	30	150	600			500		Under consideration
24		Eviin Huch LLC	15	80	300			300	Yes	Licensed
25	Ulaanbaatar Sukhbaatar District	Makh Impex	120	400	4000		120	16000	Yes	Licensed
26		Mongol Meat Expo LLC	40	200	800	24	40	1000	Yes	Licensed
27	Ulaanbaatar Bagahangai	Bagahangai Meat Factory	25	200		25		1000	Yes	Licensed
28	Ulaanbaatar Bayangol District	***Just Agro*** Meat Market LC	18		1000	120	120	6000	Yes	Licensed
29	Ulaanbaatar	***Just Group LLC*** Slot hole, initial process factory	50	200	1200	30	30	1000	Yes	Licensed
30	Ulaanbaatar Bayanzurkh District	Meat Export LLC						750		Licensed
31	Ulaanbaatar	Davshil Trade	15	80	300			300		Licensed
Total			**924**	**4,070**	**21,500**	**456**	**831**	**42,540**		
Just Group (%)			***30%***	***29%***	***32%***	***41%***	***39%***	***31.5%***		

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