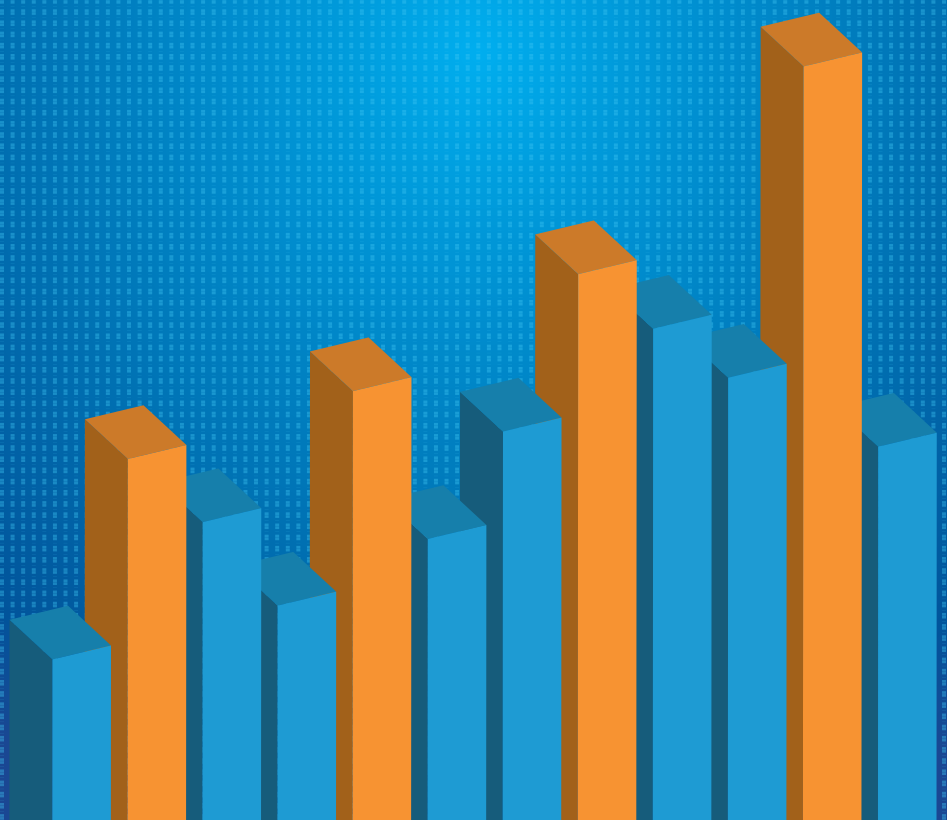
Development of Manufacturing Industries in Nepal

Current State and Future Challenges



Government of Nepal

Government of Nepal
National Planning Commission Secretariat
Central Bureau of Statistics
November, 2014

United Nations
Industrial Development Organization

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MESSAGE

I am pleased to see that the Central Bureau of Statistics is bringing out this monograph which presents candidly the state of Nepal's manufacturing. It is, of course, not a pretty sight: as a share of the national economy manufacturing has shrunk from about 10 percent in 1996-1997 to just over 6 percent in 2011-2012. In light of recent development experience of our Asian neighbors, policymakers in Nepal are convinced that we, too, cannot afford to skip manufacturing in our growth process. This conviction has only become firmer with the emergence of rigorous new evidence that manufacturing as a sector remains special. It exhibits unconditional convergence in labor productivity, it can absorb a large workforce, and can cater to demand that is not constrained by a small domestic market.

However, the manufacturing model of the twentieth century is undergoing a shift. The new emphasis, for example, is on tasks rather than industries, on behind-the-border non-policy barriers and private standards, and in improving the competitiveness of individual firms that can become regional champions. Rather than seeing services and manufacturing as distinct, modern services such as ICT, logistics and finance are beginning to play a crucial complementary role in making manufacturing competitive by lowering costs, expanding sales, differentiating products and building loyalty.

As a landlocked country, Nepal is conscious that we cannot be competitive in bulky merchandise goods reliant on shipping-based trade. However, the ascent of billions of middle class consumers in China, India and the rest of Asia negates the old curse of distance. The shift in the global center of economic gravity towards Asia and the rise of global value chains present countries like ours with hopes of manufacturing revival. Fragmentation of production across borders makes a finer division of labor possible, and poor countries can potentially leap-frog into producing parts and components without waiting to be rich enough to be capable of hosting a fully integrated production chain.

Against this backdrop of new possibilities, this monograph lays bare a future agenda where we have to start curing our self-inflicted wounds. Poor industrial relations, the lack of cheap and reliable energy and a growing shortage of skilled workers have crippled our productivity and run our industries to the ground. Despite such adversity, that the number of establishments in certain industries is growing is a testament perhaps to the intrinsic strengths of Nepali firms. The findings and insights contained in this monograph will nudge the Government to advance policy reforms and relax the most binding infrastructural constraints. I am optimistic that our manufacturing sector will see better days.

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PREFACE

The Central Bureau of Statistics (CBS) of Nepal has been conducting the Census of Manufacturing Establishments (CMEs) in every five year interval since 1964/65 to monitor and evaluate the performance of the manufacturing sector. The CME 2011/12 is the tenth in its series. The census covers all manufacturing establishments located within the geographic boundary of Nepal engaging 10 or more persons. CBS publishes a large amount of information on Nepalese manufacturing establishments through the CME data including number of establishments, employment, employee benefits, investments, input, output, value added, etc.

Despite these efforts, an analytical report of different CMEs evaluating the performance of manufacturing establishments over time is lacking. Such a report would be particularly useful for planners, policymakers, researchers, private sector actors, media and the general people to better understand the changes that occur in the manufacturing sector over time and the reasons for these developments. Hence, the CBS has for the first time prepared an analytical report based on the performance indicators of the CME data over time. The information included in the report will assists policymakers and planners to develop appropriate policies and strategies for the manufacturing sector's development.

This report provides an overview of Nepal's manufacturing sector using CMEs data from 1991/92 to 2011/12. It is the first of its kind published by the CBS and goes beyond a mere presentation of the census results towards a more insightful analysis. It presents and analyses the performance of Nepal's manufacturing sector and its social, environmental and regional impact.

The Bureau would like to express its sincere gratitude to the United Nations Industrial Development Organization (UNIDO) for its support and technical assistance in the preparation of the report. It would not have been possible to prepare this report in its current format without the technical guidance of UNIDO. I would specifically like to thank Shyam Upadhyaya, Chief Statistician of UNIDO, for his consistent guidance, Peter de Valk, UNIDO consultant to CBS for his technical support during the preparation of the report and Kateryna Gumeniuk for assistance in project implementation.

I am also grateful that the UNDP supported project "Strengthening National Planning and Monitoring Capacity (SNPMC)" assisted the CBS in the final editing of the language and the graphic design and printing of this report. I would like to extend thanks to Damodar Gnawali, Statistics Development Specialist of the SNPMC, for arranging the graphic design and printing. A special thanks to Arjun Kumal for all his help in the final editing of the language of this publication.

This publication has been prepared by a team of in-house and international experts working on UNIDO technical assistance projects. I would like to specifically mention the team of in-house directors: Nebin Lal Shrestha, Rajesh Dhital, Anil Sharma and Mahesh Chand Pradhan, Computer Officer Suresh Prasad Kayastha guided by the Deputy Director General Suman Raj Aryal. My sincere thanks go to the entire team for the hard work they have invested in preparing this report.

I would also like to thank the Statistical Officers: Surendra Rawal, Rochak Subedi and Bed Prasad Dhakal, and Statistical Assistants: Santosh Koirala as well as Ram Krishna Ghimire for their support in the preparation of this report.

Bikash Bista
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1 INTRODUCTION

Nepal continues to be a predominantly agricultural economy with around three fourth of its workforce employed in the agricultural sector. The manufacturing sector employed just 6.6 per cent of the total workforce (NLFS 2008). The contribution of manufacturing to total GDP was a minimal 6 per cent in 2010. However, expansion in the manufacturing sector, both in terms of size and productivity, can aid Nepal in alleviating poverty, generating gainful employment and accelerating economic prosperity as it has done in the other newly developing countries. This is because the manufacturing sector offers - in comparison to agriculture - greater opportunities for:

- technological progress
- output growth, productivity and capital accumulation
- transfer of surplus resources, if any, from agriculture to manufacturing
- economies of scale, and
- positive spillover effects

To capitalize on these opportunities, Nepal needs to put in place appropriate policies and strategies. However, the development of the policies and strategies cannot take place in an information vacuum. They call for access to reliable and timely information on manufacturing establishments. One way of generating the required information is conducting the census of manufacturing establishments (CMEs). The CME does not only benefit policymakers and planners but also entrepreneurs, academicians and other non-government organisations and civil societies.

Indeed, the Central Bureau of Statistics (CBS) of Nepal has been conducting the Census of Manufacturing Establishments (CMEs) every five years. Begun in 1964/65, the CBS conducted the 10th CME in 2011/12. The census covers all the manufacturing establishments engaging 10 or more persons located within the geographic boundary of Nepal.

The Central Bureau of Statistics has taken the initiative for the first time to prepare an analytical report based on the performance of the manufacturing establishments as shown by data in the censuses of the manufacturing establishments.

The Central Bureau of Statistics has produced a number of indicators to assess the industrial performance of Nepal. Among others, they include the number of establishments, employment, wages and salaries, fixed assets, input, output and value added. The CBS uses this information to compute the National Accounts Estimates and Manufacturing Production Index. Besides, policy makers, planners and researchers also use the information.

Untill now, the CBS has been producing only statistical abstracts from the CMEs. There is a lack of analytical and technical report describing the industrial performance of all these years. An analytical report would be of great interest to planners, policy makers, researchers, the private sector, media and the general people to understand the changes taking place in the manufacturing sector over the years and the reasons behind those changes. Hence, the CBS has made this attempt, for the first time, to prepare an analytical report based on the performance indicators of manufacturing establishments.

This monograph provides an overview of the manufacturing sector of Nepal using census data from 1996/97 to 2011/12. This moves beyond mere presentation of the census results towards a more insightful analysis. It presents and analyzes the performance of the manufacturing sector and its social, environmental, and regional impact. Comparisons are also made with select Asian countries to put Nepal's current situation into perspective.

This report has five chapters. Chapter One describes the layout of this report. Chapter Two describes Nepal's manufacturing policy in a historical context. Chapter Three presents the performance of the manufacturing sector, including the development of the manufacturing sector as part of the economy (Section 3.1), its structure and structural change (Section 3.2), the productivity of the sector and its subsectors (Section 3.3), and its competitiveness in terms of the manufacturing sub-sectors and the international competitive position of Nepal (Section 3.4). This last section also uses important business indicators to compare Nepal to other countries in Asia. Chapter Four discusses the impact of the manufacturing sector. Section 4.1 highlights the social impact of the manufacturing sector in terms of social inclusiveness. Social inclusiveness covers gender-disaggregated manufacturing employment, the wage gap ratio over the years and regional disparity. Section 4.2 reviews the environmental footprint. The environmental footprint section covers issues such as material intensity, energy intensity, waste management and disposal as well as the expenditure on environment related activities. Chapter Five provides the conclusions and policy-relevant recommendations.

2 MANUFACTURING OF NEPAL – HISTORICAL PERSPECTIVES AND CURRENT INDUSTRIAL POLICY

2.1 Background

The development of the manufacturing sector is crucial to attain prosperity, generate employment, alleviate poverty, promote trade and spur national income growth. However, Nepal's manufacturing sector has not been able to achieve these as desired. The sector has had uneven growth over the years due to longstanding weaknesses in the adoption of new technology, poor infrastructure, shortage of power, stalled political process, difficult trading conditions, global competition and global economic downturn. Moreover, manufacturing establishments in Nepal are primarily labour intensive and local raw materials-based. Government of Nepal has undertaken a number of policy initiatives and regulatory measures to strengthen the manufacturing sector for decades.

2.2 Manufacturing Sector Policy

Government of Nepal has accorded high priority to the improvement of the manufacturing sector since 1950s. During the 1950s and 1960s, Government of Nepal received aid commitments from the Soviet Union and China to develop a few government-owned industries. Most of these industries used agricultural products such as jute, sugar, and tea as raw materials. Other industries were dependent on various inputs imported from other countries, mainly India. Relatively small by international standards, most of the industries established in the 1950s and 1960s were developed with government protection.

Early efforts established public enterprises, basic industries in particular, with development aid. The approach was inward-looking.

The manufacturing sector has seen a significant shift in approach over the years-a shift from

The manufacturing sector policy shifted from an increasingly closed, protectionist regime (1956-85) towards a more open and flexible regime (from 1985/86 onward).

an increasingly closed, protectionist regime (1956-85) towards a more open and flexible regime (from 1985/86 onwards). During the protectionist regime, industrial investment was regulated by a rigorous licensing system. The government also protected domestic industries from competition by foreign goods levying high tariffs and quantitative restrictions on them. In addition, the imports of intermediate inputs were subjected to import licensing.

During the 1980s, the government gave priority to industries such as lumber, plywood, paper, cement, and bricks and tiles, which made use of domestic raw materials and reduced the need for imports. The government has also substantially revised the industrial licensing regime and foreign investment procedures since the mid-1980s. It challenged the fundamentals of industries and prescribed new measures to improve efficiency in the manufacturing establishments. The government took various policy measures to spur manufacturing growth. For example, in 1987/88, the government introduced a bonded warehouse (BW) and Duty Drawback (DD) systems to stimulate the export of manufactured goods.

Despite these policy measures, the manufacturing sector did not improve as expected. The 1989-90 trade dispute with India is largely to blame: Nepal could not import many inputs and this caused lower capacity utilization in some industries and lost India as its traditional market for certain goods. Even in these trying times, the government of Nepal continued to provide support to the manufacturing sector. From 1992, all manufacturers exporting more than 90% of their products benefitted from the bonded warehouse system.

The Industrial Policy 1992 made radical changes to the licensing requirements and created an environment favorable for increased private investment.

The Industrial Policy 1992 made radical changes to the licensing requirements and created an environment favorable for increased private investment. Contrary to the earlier approaches, the 1992 Industrial Policy emphasized deregulation, competition, and reliance on market forces for resource allocation in manufacturing activities. The policy also emphasized strengthening linkages between the manufacturing and agricultural sectors, promoting export oriented industries, and providing better incentives to attract investment through tax and risk reduction.

The Industrial Policy 1992 was subsequently enacted as Industrial Enterprise Act 1992. Under the Act, license requirements were imposed mainly in the manufacturing establishments that had security, public health and environmental implications.

With the enactment of Industrial Enterprises Act 1992 along with the Foreign Investment and Technology Transfer Act of 1992 (FITTA), amended in January 1996, manufacturing investment with 100% foreign ownership was permitted in all industries with the exception of those that were important from the strategic, public health and environmental point of views. The acts also ensured repatriation of foreign direct investment in convertible currencies.

To make the duty drawback system effective, the Budget Speech 2002/03 recommended various measures including the adoption of One Window System (OWS) for industrial licensing to be obtained within 30 days; manufacturing registration within 21 days; and duty drawback refund within 60 days of filing the application.

In February 2002, the government set up a special financing facility at 3% interest to encourage commercial banks to provide concessional loans to ailing industries, particularly those in the garment and hotel industries, the major earners of foreign exchange.

Industries with foreign direct investments are entitled to all the facilities and incentives, such as tax incentives provided to the domestic investors. All provisions regarding infrastructure such as permit, registration, land, electricity and water, would be provided under the OWS for the industries to be established with foreign investment.

Measures have been put in place to provide support for the rehabilitation of sick industries, for example, in a rescheduling of loan and interest, a waiver of penal interest, freezing of interest liability and concession on outstanding revenue dues among others.

In 2010, a new Industrial Policy was introduced that replaced the 18-year old Industrial Policy 1992.

In 2010, a new Industrial Policy was introduced that replaced the 18-year old Industrial Policy 1992. It promises easy exit to the investors, recognizes subcontract manufacturing, promises tariff protection to local industries with high value addition, incorporates intellectual property protection provisions, and emphasizes employment creation and poverty reduction. Ensuring balanced industrial growth, backward linkages, protection and state-support to the industries are some of the key objectives of the policy.

Under the new Industrial Policy 2010, government support would be extended to the development of infrastructure to industries on a priority basis and special tax holidays were provided for industries in rural and unindustrialized areas. The new Policy 2010 is expected to accelerate manufacturing growth guided by timely rules, regulations and

laws. It has many new provisions that would help create friendly relations between the government and private sector, and also help economic growth of the national economy by promoting the industrial sector in the country.

The policy aims to develop industrial infrastructure, such as roads, electricity and telecommunications in parts of the country having the potential for manufacturing and processing. The policy provides additional incentive packages to export industries, particularly the small and medium enterprises. It promises 25 per cent income tax concessions to small, medium and large industries that employ 100, 300 and 600 persons respectively.

The policy broadly categorized the geographical regions of the country into three groups - extremely underdeveloped, underdeveloped and developing industrial regions -- and pledged holidays in income tax and excise duties for the industries in those regions for 12 years, 7 years and 5 years, respectively.

The new Industrial Policy 2010 also envisages the development of Agro-Export Promotion Zones (AEPZs).

In addition to the existing Special Economic Zones (SEZs), the policy also envisages the development of Agro-Export Promotion Zones (AEPZs). The industries, established in both types of zones, are exempt from excise duty and value added tax on raw and packaging materials. It also recognizes research and development, and market promotion as integral parts of industrial activities, and allows 5% income tax deduction for each purpose.

The policy listed the following sectors under high priority : IT, cement, hydropower, vehicle & motor parts, chemical fertilizer, bio-technology and adventure tourism. It also listed agriculture, forest-based industries, ayurvedic & homeopathic medicine manufacturing, minerals and handicrafts as priority industries. The other provisions of the policy include no-work no-pay, business incubation center and industrial investment protection funds to compensate the ailing industries. Similarly, the policy envisages special package program to develop the Karnali industrial corridor and new industrial villages.

The year 2010 also saw the adoption of the Nepal Trade Integration Strategy, which identified 19 priority export sectors. In the manufacturing sector, these were instant noodles, handmade paper, silver jewellery, iron and steel, pashmina, and wool products. Dairy products were mentioned under additional potential export sector. Sector specific recommendations were derived from detailed Strength, Weakness, Opportunity, and Threat (SWOT) analyses.

2.3 Manufacturing Sector in Different Planning Periods

The Government's development plans consistently emphasized the importance of manufacturing sector growth for ensuring employment and income growth. From the early 1990s, there have been planned campaigns to reform and privatize the public enterprises.

The Eighth Five Year Plan (1992-1997) emphasized generating extra income and employment by enhancing interrelationships between production-oriented industrial sector and other economic activities. The Eighth Plan contributed several policies and legal instruments to the manufacturing sector. The major ones are: Private Sector Engagement, the Single Window Scheme, Industrial Policy 1992, Industrial Enterprise Act 1992, Foreign Investment Policy 1992, Foreign Investment and Technology Act 1992, Company Act 1996, and Labour Laws. As a result, by the beginning of the Ninth Five-Year Plan (1997-2002), 16 public enterprises, over half industrial, had been handed over to private owners, and four were shut down.

The Ninth Five Year Plan (1997-2002) aimed at doubling the contribution of the manufacturing sector (i.e. from 10% to 20%) to the GDP. Consequently, the Plan envisaged a long term concept of integrated and sustainable industrial development and emphasized policy consistency to mobilize resources, impart greater role to the private sector to enhance competitiveness. It was, however, somewhat mute regarding the employment aspect.

As expected, the Tenth Five Year Plan (2002-2007) focused on industrial employment as a means of alleviating poverty, increasing income and purchasing capacity of rural people. During this period, the government of Nepal, with support from the United Nations Industrial Development Organization (UNIDO) and the United Nations Development Program (UNDP), introduced a white paper on the industrial strategy entitled "Industrial Development Perspective Plan: Vision 2020." The strategy was premised on public-private partnership and joint implementation mechanisms. It consisted of five components:

- restructuring ailing industries and fostering promising future industries;

During the 2002 – 2007 planning period, the Government of Nepal, with support from United Nations Industrial Development Organization (UNIDO), introduced a white paper on industrial strategy entitled "Industrial Development Perspective Plan: Vision 2020"

- raising the productive efficiency and technological capabilities of domestic firms;
- additional investment in physical infrastructure;
- improving education quality and industrial skills; and creating an enabling business environment.
- to promote the manufacturing sector the government took the role of facilitator and formulated the following strategies: promotion of foreign direct investment; implementation of Industrial Perspective Plan; identification of indurial sector having comparative advantages; sustainable development of infrastructures and skills to develop micro, cottage and small scale industries etc.

The Eleventh Three Year Plan (2010-2013) admitted the country's inability to benefit from industrial development potentialities.

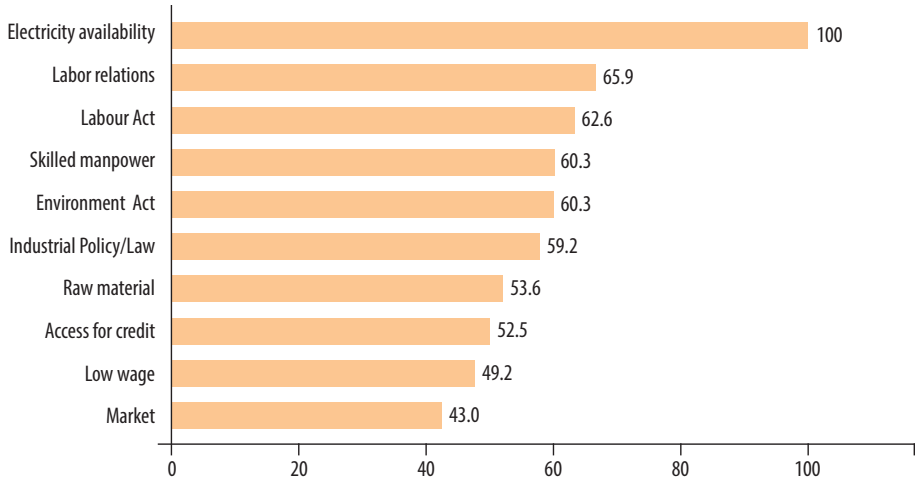
Despite positive policy measures, the pace of industrialization during the Tenth Plan lagged below expectation- only a growth rate of 1.9% could be achieved against the set target of 7.8%. The contribution of manufacturing and mining to the GDP was only 8.1% against the target of 9.3%. The experience of the Eleventh Plan demanded that Nepal improve law and order, service delivery, and production infrastructure and strengthen institutional capacity.

The Eleventh Three Year Plan (2010-2013) admitted the country's inability to benefit from industrial development potentialities. The inability resulted from a number of factors, including limited managerial and technical skills, inadequate guarantee of industrial security, weak investment climate, lack of export diversification, lack of industrial friendly labour policy, and irregular supply of electricity.

Thus, the Eleventh Plan emphasized increasing the national income and employment opportunities by increasing the export of industrial products and promoting domestic and foreign investment. The investment climate would be created by developing a strong investment foundation and entrepreneurial skills. Indeed, the private sector-led industrial development started to flourish due to the investment-friendly measures undertaken by the government in the manufacturing sector, for example financial, procedural and other concessions given to industries and high priority accorded to foreign direct investment. A new Industrial Policy 2010 was also introduced during this Plan period, replacing the 18-year-old Industrial Policy 1992.

The Government of Nepal declared the year 2012/13 as the National Investment Year and also mediated between labourers and employers to strike a deal on minimum wage,

Figure 2-1: Major problems perceived by manufacturing entrepreneurs (in %)



implementation of no- work no-pay principle and four years' moratorium on strikes. All these efforts are expected to bring about a positive change in the development of the manufacturing sector in the country.

Perceptions of entrepreneurs on the bottlenecks that still plague further development of the manufacturing sector are summarized in Figure 2-1 (see Table A-1 for sectoral details). Electricity Availability is the major problem that has persisted for many years. This is followed by labour relations, shortages of skilled labour, and the Environmental Act.

2.4 Conclusion

Overall, the Government of Nepal has undertaken a number of policy and regulatory measures to strengthen the manufacturing sector in Nepal. The country is moving towards a more open, and flexible approach including encouragement of direct foreign investment in the development of the manufacturing sector. The Industrial Policy 2010 aims to bring about further positive changes in the area of the manufacturing sector in Nepal. Yet, the longstanding and major production problems like shortage of electricity, lack of skilled labour and poor labour-employer relations call for permanent solution.

The Industrial Policy 2010 aims to bring further positive changes in the area of manufacturing sector development in Nepal. Yet, the amelioration of the major production problems of electricity, skilled labor and labour relations that need to be addressed require a long term view.

3 MANUFACTURING PERFORMANCE

This chapter on manufacturing performance presents the details of the manufacturing sector in terms of its position in the economy, its current structure and structural change it underwent, its productivity, and its international performance in comparison with a select group of countries in the wider region. The data used are primarily those of the censuses of the manufacturing establishments conducted in 1996/97, 2001/02, 2006/07 and 2011/12 at the 2 digit level of the International Standard Industrial Classification Revision 3 (ISIC rev.3). A higher level of details are available, but the 2 digit level is selected to keep the report manageable and to guarantee confidentiality of the firm-level information. International database were used for assessing Nepal's comparative performance.

3.1 Manufacturing in GDP

The manufacturing sector did not perform as the engine of growth.

Nepal's manufacturing sector has not performed as the engine of growth. In fact, its share in GDP gradually declined from 9.0 per cent in 2000/01 to 6.2 per cent in 2012/13 (Table 3-1). Other sectors - transport, storage and communications and financial intermediation - increased their shares in the economy over the years. Still others showed minor changes. Agriculture maintained its dominant position with 34.3 per cent in 2012/13.

Nepal's manufacturing sector is the smallest in the region.

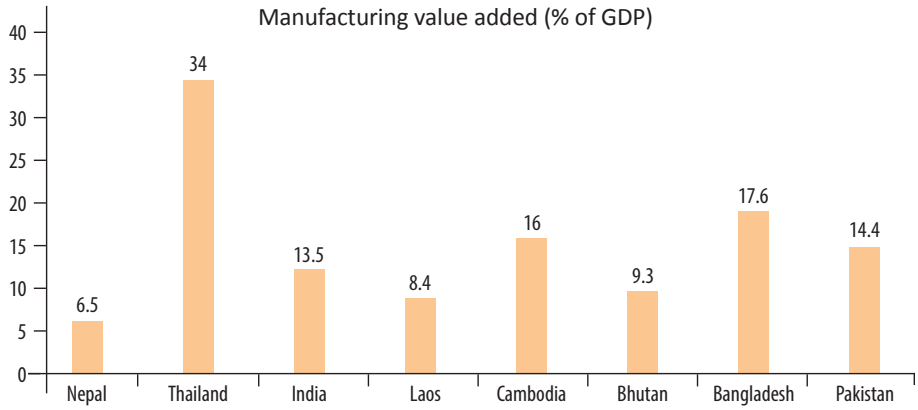
Regionally, Nepal's manufacturing sector holds a very small percentage share of the GDP (6.5 per cent in 2012, according the WDI tables). In fact, it is by far the smallest in the region (see Figure 3-1).

Figure 3-2 gives the average growth rates of value added by sector from 2000/01 to 2012/13 (for more details on growth rates per year see Table A-2). The average growth rate of manufacturing value added per capita was slightly negative over 2000/01 -2012/13

Table 3-1: Composition of gross domestic product by ISIC division at current price 2000/01 to 2012/13 (%)

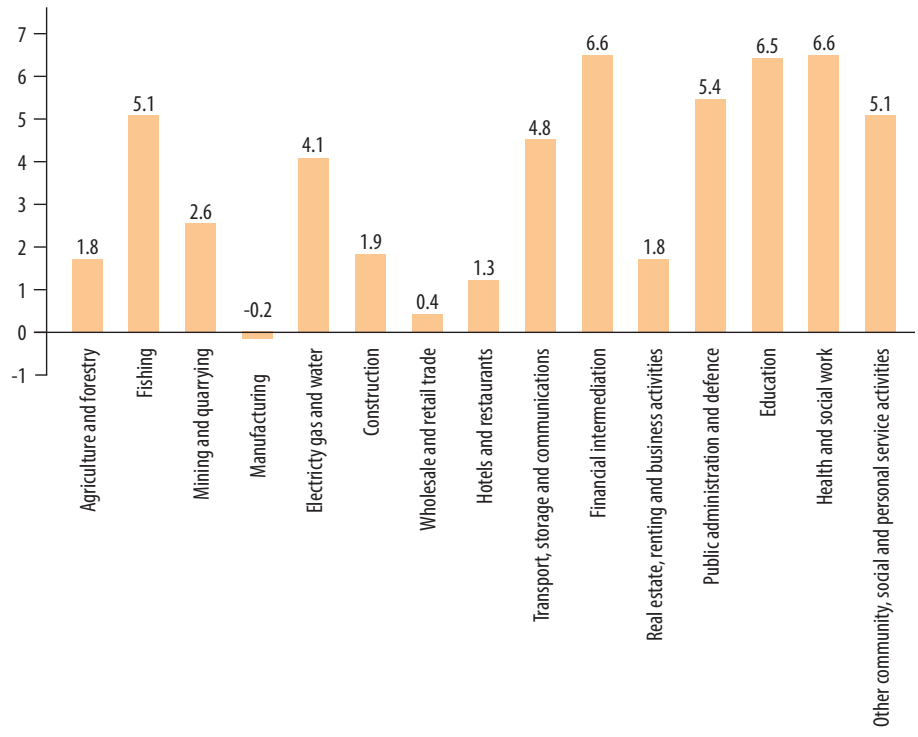
NSIC	Industrial Classification	2000 /01	2001 /02	2002 /03	2003 /04	2004 /05	2005 /06	2006 /07	2007 /08	2008 /09	2009 /10	2010 /11	2011 /12	2012 /13
A	Agriculture and forestry	36.1	36.9	36.0	35.4	34.7	33.1	32.1	31.2	32.5	35.0	36.5	35.4	34.3
B	Fishing	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4
C	Mining and quarrying	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.6	0.6
D	Manufacturing	9.0	8.5	8.2	8.0	7.9	7.6	7.5	7.3	7.0	6.3	6.2	6.3	6.2
E	Electricty gas and water	1.8	2.1	2.4	2.3	2.3	2.1	2.1	2.0	1.6	1.4	1.8	1.2	1.3
F	Construction	6.0	6.5	6.5	6.4	6.5	6.5	6.5	6.9	6.8	6.9	6.9	6.8	6.9
G	Wholesale and retail trade	16.4	14.6	14.5	15.3	14.1	14.3	13.3	13.5	13.2	14.4	13.8	13.7	14.4
H	Hotels and restaurants	2.0	1.6	1.6	1.7	1.6	1.5	1.4	1.5	1.5	1.6	1.6	1.7	1.8
I	Transport, storage and communications	7.4	7.9	8.3	8.9	9.1	9.7	10.0	9.9	9.9	8.5	8.2	8.6	9.2
J	Financial intermediation	2.7	2.7	2.7	2.7	3.1	3.5	4.1	4.3	4.2	4.1	3.9	4.5	4.2
K	Real estate, renting and business activities	8.3	8.2	8.1	7.7	8.7	9.5	10.2	9.4	8.7	8.4	8.2	8.3	8.5
L	Public administration and defence	1.2	1.6	1.7	1.5	1.7	1.7	1.8	1.8	2.0	1.9	1.9	2.0	1.9
M	Education	4.1	4.7	5.2	5.1	5.6	5.6	5.9	6.3	6.7	5.5	5.2	5.5	5.4
N	Health and social work	1.0	1.0	1.1	1.1	1.2	1.2	1.2	1.4	1.5	1.4	1.3	1.4	1.4
O	Other community, social and personal service activities	3.0	2.7	2.6	2.7	2.7	2.7	3.1	3.4	3.6	3.7	3.6	3.7	3.5

Figure 3-1: Regional comparison of manufacturing value added share in GDP (2012)



Source: *Based on World Development Index Tables (2013)*

Figure 3-2: Average growth rates of value added by sector (in %), 2000/01 – 2012/13



Over the period from 2000/01 to 2012/13, the manufacturing sector just kept pace with population growth and is the only sector that experienced decline (-0.2%).

period: -0.2 per cent. The manufacturing sector just kept pace with the population growth and is the only sector that experienced a decline. The fastest growing sectors were: fishing (5.1%), electricity and water (4.1%), transport, storage and communication (4.8%), financial intermediation (6.6%), and various services (together about 6%).

3.2 Manufacturing Sector Structure and Structural Change

Thus, apart from a declining contribution to total GDP, the manufacturing sector also retreated towards more basic industries.

Although the share of manufacturing in total GDP decreased from 9.0 per cent to 6.2 per cent (see Table 3-1), the manufacturing sector underwent some substantial changes in its composition by sub-sectors (see also Figure 3-3). The major change is the increase of the share in value added of the food and beverages sector from 22.8 per cent in 1996 to 34.0 per cent in 2011. This went up at the expense of textiles (from 25.9 per cent to 3.8 per cent), and wearing apparel and fur (from 6.3 per cent to 0.5 percent).

All these sectors are classified as low technology sectors but within these the food sector can be regarded as the first step towards industrialization. It is driven by domestic demand and uses mainly agricultural inputs, with low value added to input ratios. Thus, apart from a declining contribution to the total GDP, the manufacturing sector also retreated towards more basic industries.

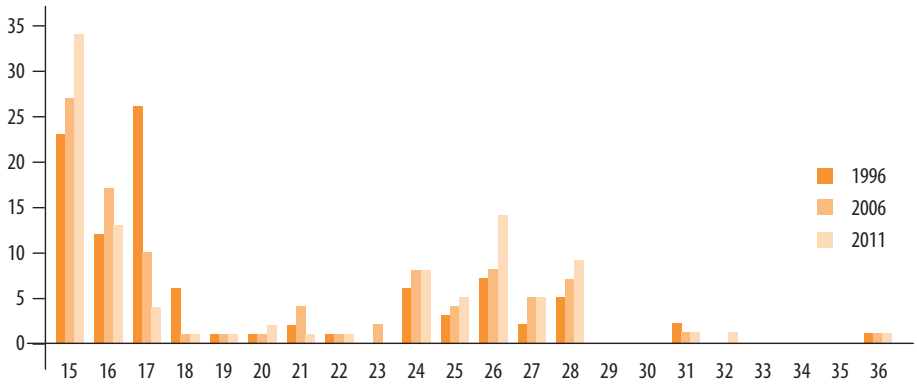
From a policy perspective, this means that agro-based industries should be taken as one of the starting points for quality improvements, product diversification, technological development, competition with imports, and export expansion.

Similar to its share in a number of manufacturing industries, food and beverages contributed the highest share in the value added, in both 2006 and 2011. In 1996, the value added from textiles was the highest among other branches. The share of value added from food and beverages in the last 15 years increased from 23 per cent in 1996 to 34 per cent in 2011. Similar patterns were observed for non-metallic mineral products (7 per cent in 1996 to 14 per cent in 2011).

Table 3-2: Value added (in million Rs) and its share by 2 digit ISIC branches

ISIC	Description	1996		2006		2011	
		VA	% Share	VA	% Share	VA	% Share
15	Food and beverages	4996	22.8	12907	27.0	30865	34.0
16	Tobacco products	2624	12.0	8164	17.1	11921	13.1
17	Textiles	5673	25.9	4873	10.2	3425	3.8
18	Wearing apparel, fur	1376	6.3	668	1.4	486	0.5
19	Leather, leather products and footwear	288	1.3	293	0.6	771	0.8
20	Wood products (excluding furniture)	309	1.4	615	1.3	1798	2.0
21	Paper and paper products	370	1.7	2007	4.2	904	1.0
22	Printing and publishing	316	1.4	541	1.1	571	0.6
23	Coke, refined petroleum products, nuclear fuel	33	0.2	942	2.0	366	0.4
24	Chemicals and chemical products	1318	6.0	3897	8.1	6976	7.7
25	Rubber and plastics products	649	3.0	2004	4.2	4225	4.7
26	Non-metallic mineral products	1584	7.2	3758	7.9	12716	14.0
27	Basic metals	386	1.8	2418	5.1	4903	5.4
28	Fabricated metal products	1095	5.0	3409	7.1	8117	8.9
29	Machinery and equipment n.e.c.	18	0.1	132	0.3	270	0.3
31	Electrical machinery and apparatus	483	2.2	547	1.1	772	0.8
32	Radio, television and communication equipment	59	0.3	188	0.4	492	0.5
34	Motor vehicles, trailers, semi-trailers	5	0.0	23	0.0	82	0.1
36	Furniture; manufacturing n.e.c.	292	1.3	449	0.9	1169	1.3
	Total	**21874**	**100**	**47835**	**100**	**90829**	**100**

Figure 3-3: Percentage share of ISIC branches in value added



Value added from textiles significantly decreased over the years. It decreased by 6 percentage points from 2006 to 2011 and by 22 percentage points from 1996 to 2011. Although tobacco products based manufacturing has only around 1 per cent share in the total number of manufacturing, its share in value added has been very significant (12 per cent in 1996, 17 per cent in 2006 and 13 per cent in 2011) standing 2nd and 3rd in total share in value added. This might be the case because the output was reported at market prices (including tax).

3.2.1 Current and Past Structures

The current status of the manufacturing industries is best described by the size of the manufacturing establishments, number of employees, wages/salaries, investments, inputs, output, and value added. In addition, performance indicators provide further insights into the structure of the firms: the average number of employees per establishment, inputs as percentage of output, Manufacturing Value Added (MVA)/employee, MVA/output ratio, and MVA/capital ratio.

The overall picture that emerges is that the manufacturing sector had its best year in 1991/92, declined in the census years 1996/97, 2001/2002, and 2006/07, and started a cautious recovery by the year 2011/12.

Table 3-3 provides an interesting overview of what happened to the manufacturing sector in terms of the above indicators comparing various census years to the year 1991/92 (Table A-3 gives the absolute figures).

Table 3-3: Principal indicators' index of the manufacturing sector by census year

Description	Principal Indicators' Index (1991/92=100)				
	1991/92	1996/97	2001/02	2006/07	2011/12
No. of establishments	100	83	75	81	95
No. of employees	100	88	85	80	91
Wages/Salaries & other benefits to employees	100	89	114	114	146
Gross fixed assets at the end of the year	100	97	120	187	177
Input	100	125	193	265	353
Output	100	122	172	225	289
Value added	100	118	143	168	198
Average no. of employees per firm	100	105	113	99	96
Input as percentage of output	100	103	112	118	122
MVA/Employee	100	134	168	211	217
MVA/Output ratio	100	96	83	75	68
MVA per unit of capital	100	121	119	90	112

The indices of Table 3-3 provide the following information (see also Figure 3-6):

- The total number of operating establishments declined by 17%, 25%, 19%, and 5% in the year 1996/97, 2001/02, 2006/07 and 2011/12 respectively;
- The total number of employees declined by 12%, 15%, 20% and 9% in CME year 1996/97, 2001/02, 2006/07 and 2011/12 respectively;
- The average size of manufacturing establishments fluctuated over the years with a peak in 2001/02 (see also Figure 3-4);
- Real wages/salaries (including other benefits) declined by 11% in 1996/97, increased by 14% in 2001/02 and 2006/07 and by 46% in 2011/12;
- Gross fixed assets at the end of the year decreased by 3% in 1996/97 and increased by 20%, 87% and 77% in 2001/02, 2006/07 and 2011/12 respectively;
- Inputs rapidly increased by 25%, 93%, 165% and 253% in the year 1996/97, 2001/02, 2006/07 and 2011/12 respectively.
- However, real output increased only by 22%, 72%, 125% and 189% in the year 1996/97, 2001/02, 2006/07 and 2011/12 respectively. As a consequence, inputs per unit of output gradually increased by 3%, 12%, 18% and 22% over the four census years;
- Value added of manufacturing industries significantly increased by 18%, 43%, 68% and 98% in the CME year 1996/97, 2001/02, 2006/07 and 2011/12 respectively;

- MVA/Employee, the measure of labour productivity of the manufacturing industries increased by 34%, 68%, 111% and 117% in the year 1996/97, 2001/02, 2006/07 and 2011/12 respectively;
- MVA per unit of capital somewhat erratically behaved, particularly for the year 2006/07 (see also Figure 3-5); this could have been caused by changes in the utilization of capacity for the year.
- The MVA/Output ratio decreased by 4%, 17%, 25% and 32% in the CME year 1996/97, 2001/02, 2006/07 and 2011/12 compared to the CME year 1991/92, indicating that inputs are at a higher proportion of output, perhaps the result of a structural change towards agro-based industries (see also Figure 3-5).

Figure 3-4: Average number of employees per establishment and MVA per employee

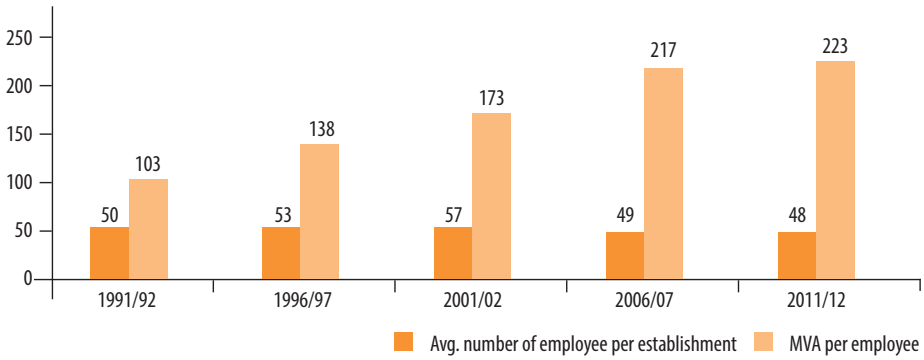


Figure 3-5: MVA per unit of output and MVA per unit of capital

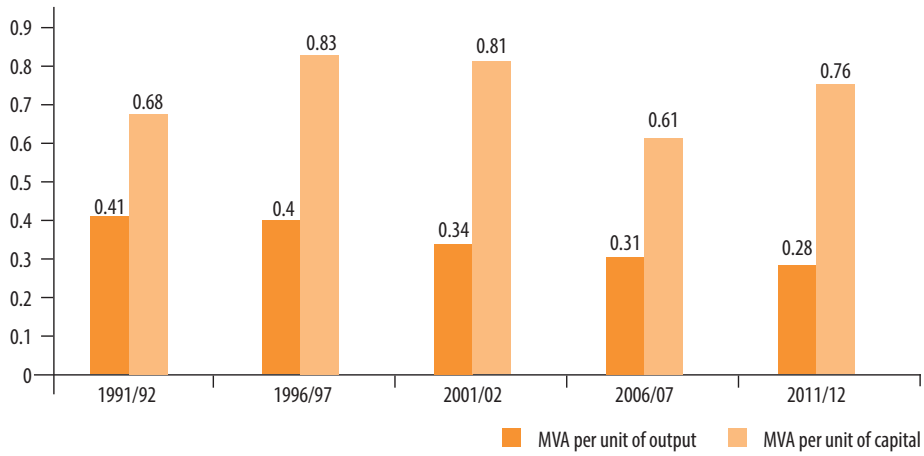


Figure 3-6 : Principal Indicators' Index (1991/92=100) by CME year

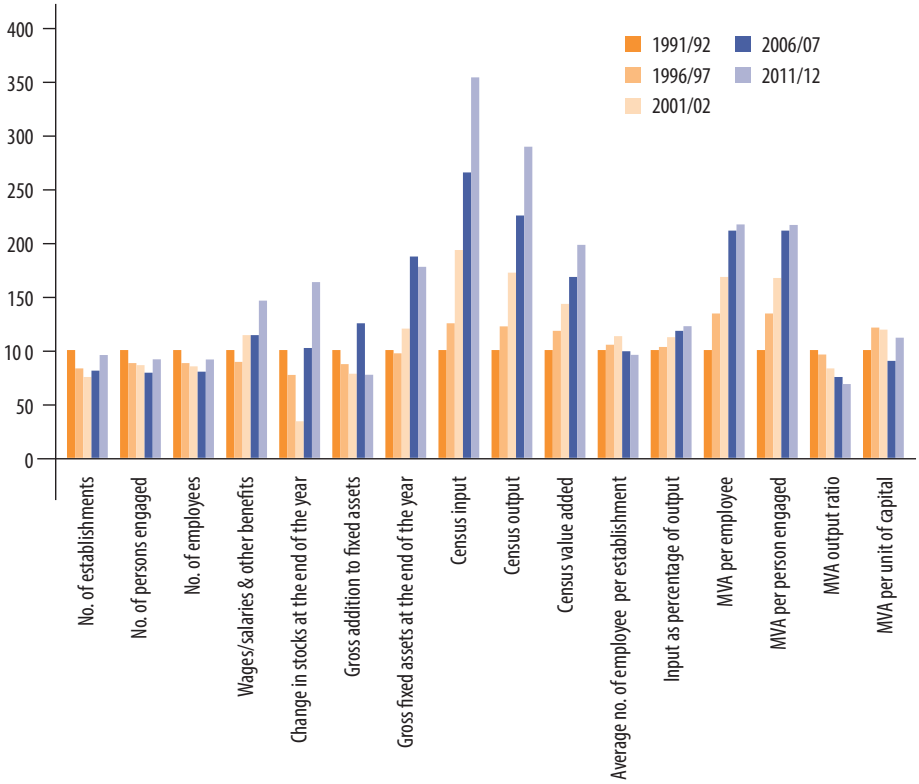
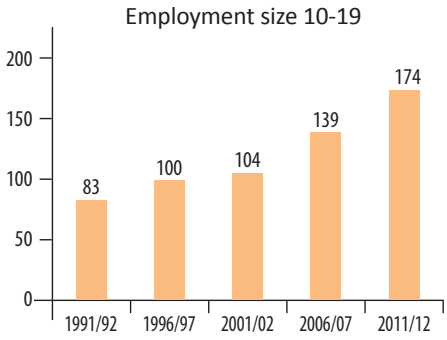
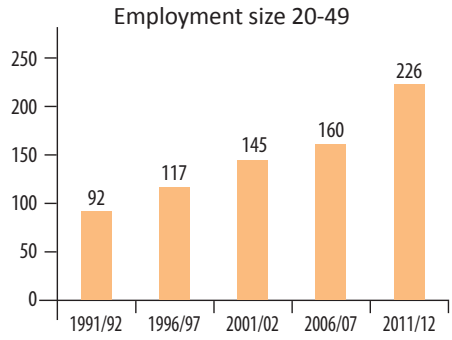


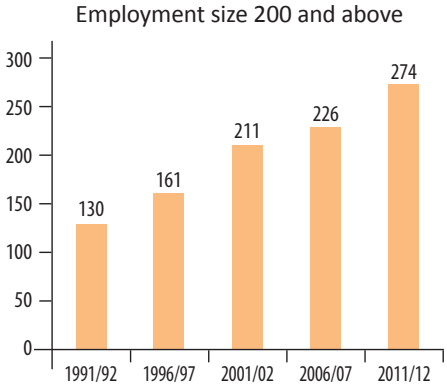
Table A-5 provides information on the principal indicators by firm size as measured by the number of employees:

- MVA per employee within each size category increased in each census year except in employment size (100-199);
- MVA/Output ratio decreased in all employment size in the first three CME years but increased in all employment size in the last two CME years;
- MVA per unit of capital by employment size show erratic and drastic changes. This might indicate the needs of further study on capital stock data.

Figure 3-7: MVA per employee by firm size







3.2.2 Structural Change

With the ongoing development in manufacturing, structural change is likely to occur in terms of higher manufacturing employment, higher productivity of labour and capital, and transformation from a less technology-intensive sector to a more technology-intensive sector. This section describes the structural change that has taken place over the years in terms of manufacturing sub-sectors.

Structural change measures the shift in sectoral shares of manufacturing industries over a certain period of time. The percentage share of a sector in total manufacturing is calculated as:

$$S_k = \frac{x_k}{\sum_{i=1}^{n} x_i} \times 100$$

Where:
S_k = share of the kth sector in total
x_i = value of the variable being analyzed for the ith ISIC branch
n = number of ISIC branches in the observation

Table 3-4 gives the number of firms by sector and their share in the total number of firms in manufacturing (see also Figure 3-8). There is a substantial decline in the total number of manufacturing industries between 1996 to 2006 period, primarily in sectors such as textiles, wearing apparel & fur; paper & paper products, leather, leather products & footwear, fabricated metals, and tobacco products. While textiles and wearing apparel & fur continued to decline substantially over the 15-year period, a recovery took place in the leather, leather products & footwear, and paper & paper products in the period 2006-2011.

Table 3-4: Number of firms and the shares in the total number of manufacturing firms 2 digit ISIC

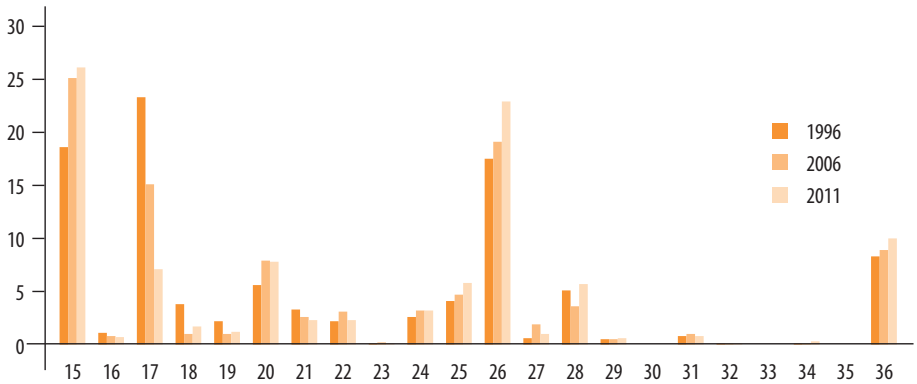
ISIC	Description	1996		2006		2011	
		No.	% Share	No.	% Share	No.	% Share
15	Food and beverages	661	18.6	863	25.1	1071	26.3
16	Tobacco products	38	1.1	28	0.8	30	0.7
17	Textiles	828	23.3	519	15.1	288	7.1
18	Wearing apparel, fur	136	3.8	36	1.0	71	1.7
19	Leather, leather products and footwear	77	2.2	36	1.0	50	1.2
20	Wood products (excluding furniture)	198	5.6	271	7.9	319	7.8
21	Paper and paper products	118	3.3	91	2.6	92	2.3
22	Printing and publishing	79	2.2	105	3.1	94	2.3
23	Coke, refined petroleum products, nuclear fuel	3	0.1	7	0.2	6	0.1

Contd..

ISIC	Description	1996		2006		2011	
		No.	% Share	No.	% Share	No.	% Share
24	Chemicals and chemical products		2.6	109	3.2	131	3.2
25	Rubber and plastics products		92	162	4.7	237	5.8
26	Non-metallic mineral products	623	146	657	19.1	928	22. 8
27	Basic metals	22	0.6	67	1.9	43	1. 1
28	Fabricated metal products	183	5.1	124	3.6	229	5. 6
29	Machinery and equipment n.e.c.	19	0.5	18	0.5	26	0.6
31	Electrical machinery and apparatus	29	0.8	33	1.0	33	0.8
32	Radio, television and communication equipment	5	0.1	5	0.1	5	0.1
34	Motor vehicles, trailers, semi-trailers	5	0.1	5	0.1	14	0.3
36	Furniture; manufacturing n.e.c.	295	8.3	306	8.9	409	10
	Total	**3557**	**100**	**3442**	**100**	**4076**	**100**

Food & beverages, non-metallic mineral products, wood products, rubber & plastic products, chemicals & chemicals products, furniture, manufacturing n.e.c, and fabricated metal products continued to expand consistently between 1996 and 2011. The share of manufacturing industries based on food & beverages, and non-metallic mineral products occupied the first two positionsin both 2006 and 2011 respectively. Radio, television & communication equipment showed no sign of change over the years.

Figure 3-8: Percentage share of ISIC branches in total number of industries



The number of industries in textiles significantly decreased by 8 percentage points from 2006 to 2011 and by 16 percentage points from 1996 to 2011. Textiles, which were the primary manufacturing industries in the 1996, seems to have been replaced by food & beverages and non-metallic products. There has been a significant increase in the share of the number of industries based on food & beverages in the last 15 years from 19 per cent in 1996 to 26 per cent in 2011. Similar patterns were also observed for non-metallic mineral products (18 per cent in 1996 to 23 per cent in 2011).

3.2.2.1 Integral Coefficient of Structural Change

The integral coefficient of structural change measures the combined effect of the sector shifts on the overall structural change in the industry. The formula for the computation of the coefficient of structural change is given by:

$$d_{\text{int}} = \sqrt{\frac{1}{n}\sum \frac{(s_{i1} - s_{i0})^2}{(s_{i1} + s_{i0})^2}}$$

Where,
S_{i1} and S_{i0} are the shares of ith sector in the total value of the variable being analyzed for the periods 1 and 0.

The value of the coefficient ranges from 0 to 1. The magnitude of the coefficient represents the scale of the structural change. The value of $d_{\text{int}} \leq 0.1$ would mean an identical structure in both time periods, $d_{\text{int}} \geq 0.9$ would indicate a complete reversal of sector distribution. For more realistic scenarios, a significant structural change would result in a value of $d_{\text{int}} \geq 0.5$.

Table 3-5: Integral coefficient of structural change, 1996-2011, Nepal

Period	Integral coefficient of structural change	
	Number of establishments	Value added
2006-2011	0.178	0.297
1996-2011	0.233	0.415

Although there have been significant changes in the sector share of food and beverages, non-metallic mineral products and textiles in number and value added, and data on coefficient of structural change suggest that the overall significant structural change has not yet taken place over the years. However, structural change is more prevalent in value added (0.415) compare to nature of manufacturing industries itself (0.233) in the last 15 years (see Table 3-5).

3.2.2.2 Rank Correlation

To check on the reliability of the above coefficient of structural change, the Spearman rank correlation between sectoral shares is calculated. It shows the strength of the relation between the sector shares in two periods. The Spearman rank correlation coefficient (ρ_s) is given by:

$$\rho_s = 1 - \frac{6\sum d^2}{n(n^2-1)}$$

Where,
d = the difference of ranks of manufacturing sectors (ISIC branches) in observed time periods by a chosen variable
n = number of sectors in observation

The interpretation of the coefficient is such that when sector shares do not differ much between the two periods, they show a high degree of correlation and the value of ρ is close to 1. The value of ρ tends to be zero for less correlated data, consequently sector shares are more diverse and there is significant structural change.

Table 3-6: Rank correlation coefficient, 1996-2011, Nepal

Period	Rank correlation coefficient in	
	Number of establishments	Value added
2006-2011	0.988	0. 846
1996-2011	0.954	0. 779

Only little structural change has taken place over the census years from 1996 to 2011.

The high degree of rank correlation coefficient in different years, for both nature of manufacturing establishments and value added, suggest that the sector shares are highly correlated and only little structural change occurred between the two periods (see Table 3-6). No new leading sector successfully emerged over the years. Confirming the findings of the coefficient of structural change, the rank correlation coefficient also shows that structural change is more prevalent in value added than in the number of industries.

3.2.2.3 Coefficient of Diversification

Structural change and subsequent industrial growth lead to the diversification of production across a wide range of manufacturing activities. The coefficient of

diversification shows the extent to which the production is spread across different manufacturing branches and is based on the share of manufacturing branches in total output. It is calculated as:

$$C_d = \frac{\sum s_i \ln s_i}{-\ln n}$$

Where,
C_d = Coefficient of diversification
S_i = Share of the ith branch
n = Total number of manufacturing establishments
ln = natural logarithm

C_d equals 0 when the value is concentrated on one branch of the industry, which would mean a complete lack of diversification. The coefficient of diversification equals 1 when all the branches have an equal value, indicating perfect diversification.

Table 3-7: Coefficient of diversification, 1996-2011, Nepal

Period	Coefficient of diversification for	
	Number of ISIC branches	Value added
1996	0.774	0.755
2006	0.765	0.784
2011	0.758	0.727

The high degree of coefficient of diversification in all three census years from 1996 to 2011 indicates that the production is not only concentrated in one branch of industry but it is distributed across different manufacturing branches (see Table 3-7). There is very little change in the coefficient of diversification over the census years. Together with the lack of structural change, overall weak performance of the manufacturing sector underscores the fact that the industrial sector remained rather stagnant over the census years: evenly spread out across sectors but with low value added and without any leading sectors.

3.3 Productivity

Industrial performance of a nation is an outcome of various social, economic and technological factors. Productivity, structural change and competitiveness are three main dimensions of industrial performance. This section discusses various measures of productivity. Productivity is an important measure of the efficiency of production and its productivity performance indicator is a crucial variable for industrial policy making.

Productivity is a ratio of a measure of output to a measure of input use. In practice, it is derived from the ratio of the value of real output to the value of input over a period of time of the nation. But a precise measurement of productivity is not so straightforward, especially due to the complexity of input components. In economic statistics, inputs are disaggregated into two major groups. The first one is primary inputs (also known as factors of production) comprising labour input and capital input and the second one is intermediate inputs (materials and supplies, energy, industrial services, etc.). The change in productivity occurs as a result of the change in the efficiency of the use of all these inputs. An approximate estimation of the combined effect of a change in primary inputs on output is called total factor productivity.

Productivity can be measured in different ways, depending on the definition of output and input components or measures. The following partial productivity indicators are discussed below: value added per capita, value added per employee, value added per unit of capital, value added per output (sections 3.3.1 to 3.3.4). Section 3.3.5 presents total factor productivity, while the share of training in wages and salaries is presented in Section 0 as an indication of the efforts by firms to improve productivity by labour skill improvements.

3.3.1 Manufacturing Value Added Per Capita

Manufacturing Value Added (MVA) per capita of a country is a ratio of MVA to the entire population of a country. The MVA per capita indicates the level of industrial development achieved by a country.

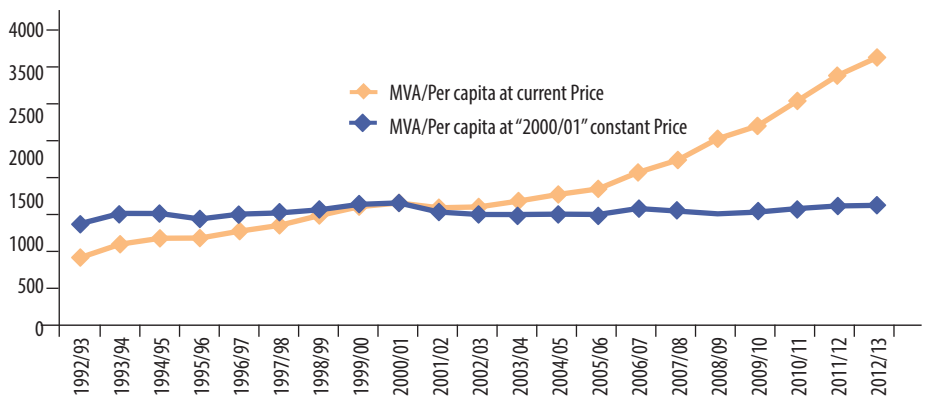
MVA per capita at constant prices only increased in 1993/94 and declined again in 1995/96. Since then it remained rather stagnant until 2010/11 with only small increases in the recent three year period - 2010/11 to 2012/13.

Table 3-8 and Figure 3-9 present the MVA per capita over 1992/93 to 2012/13 at current and constant prices of Nepal. Following the inflation trend, MVA per capita at current prices gradually increased during this period except in the year 2001/02 and 2002/03. This might be the impact of insurgency in the country. MVA per capita at constant prices only increased in 1993/94 and declined again in 1995/96. Since then it remained rather stagnant until 2010/11 with only small increases in the recent three year period 2010/11 to 2012/13.

Table 3-8: MVA per capita over 1992/93 to 2012/13 at constant price

Year	MVA at current Price	MVA at constant Price "2000/01"	Population in million	MVA/Per capita at constant Price
1992/93	15818	23719	17.1954	1379
1993/94	19327	26643	17.5563	1518
1994/95	21160	27165	17.9248	1516
1995/96	24310	29620	20.53	1443
1996/97	26853	31710	21.02	1509
1997/98	29201	32794	21.53	1523
1998/99	32827	34530	22.04	1567
1999/00	36304	37016	22.57	1640
2000/01	38409	38409	23.15	1659
2001/02	37736	36364	23.67	1536
2002/03	38826	36380	24.2	1503
2003/04	41673	37163	24.74	1502
2004/05	44885	38136	25.3	1507
2005/06	47840	38898	25.87	1504
2006/07	52172	39891	25.18	1584
2007/08	57185	39545	25.53	1549
2008/09	65447	39132	25.89	1511
2009/10	70924	40291	26.25	1535
2010/11	80531	41923	26.49	1583
2011/12	90794	43445	26.85	1618
2012/13	98709	44248	27.21	1626

Figure 3-9: MVA per capita over 1992/93 to 2012/13 at current and constant prices



3.3.2 Manufacturing Value Added Per Employee

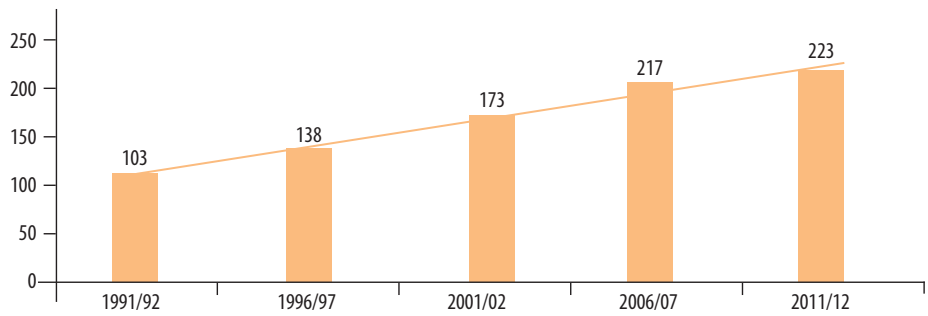
Value added per employee is a measure of labour productivity in manufacturing. When labour is more skilled or when more capital is used by labour, this results in a higher value added. Labour productivity thus provides a mixed measure of labour skills and capital intensity.

The value added per employee by census year is presented in Table 3-9 and Figure 3-10. These data show that value added per employee gradually increased till census year 2001/02. Following census year 2001/02, it rapidly increased in the census year 2006/07 and a small positive change in the census year 2011/12 compared to the census year 2006/07.

Table 3-9: MVA per employee by manufacturing census year, Nepal (values are in Rs.'000' and at constant price=2000/01)

Census year	No. of establishments	No. of employees	Wages, salaries & other benefits	Gross fixed asserts at the end of the Year	Value added	MVA at constant price (2000/01)	MVA/ Employee (at constant price)
1991/92	4271	213653	3348493	20067126	13649922	21969689	103
1996/97	3557	187316	4058069	26491045	21875315	25831608	138
2001/02	3213	181943	6 389661	40371381	32604606	31419222	173
2006/07	3446	169891	8044096	78889352	48138548	36807000	217
2011/12	4076	194989	16440763	119728060	90830311	43462446	223

Figure 3-10 : MVA per employee at constant price by manufacturing census years (in Rs'000')



The MVA per employee by census year and sub-sectors is shown in Table 3-10. Tobacco products hold the first position in all the CME years, followed by fabricated metal products, basic metal, and radio, television & communication equipment in the CME year 2011/12. Tobacco's top position may be due to the high tax rate that applies to its final product. Coke, refined petroleum products & nuclear fuel occupied the second position in the CME year 2006/07 and 2001/02. Basic metal occupied the second position in 1996/97 and 1991/92. Most of these sectors are capital intensive, which give rise to high labour productivity.

Table 3-10: MVA per employee by census years and by manufacturing sub-sector (values are in '000' and at constant prices)

ISIC3	Description	MVA/Employee				
		1991/92	1996/97	2001/02	2006/07	2011/12
15	Food and beverages	187	262	329	345	429
16	Tobacco products	399	986	1446	2453	3599
17	Textiles	84	92	95	93	75
18	Wearing apparel, fur	106	109	127	106	96
19	Leather, leather products and footwear	204	173	196	192	184
20	Wood products (excl. furniture)	130	109	75	105	135
21	Paper and paper products	111	134	157	432	160
22	Printing and publishing	55	157	173	110	135
23	Coke, refined petroleum products, nuclear fuel		264	527	1687	439
24	Chemicals and chemical products	184	319	426	377	454
25	Rubber and plastics products	170	249	245	222	277
26	Non-metallic mineral products	42	44	39	60	71
27	Basic metals	375	385	257	522	491
28	Fabricated metal products	172	271	344	449	511
29	Machinery and equipment n.e.c.		87	137	305	145
31	Electrical machinery and apparatus	278	376	185	203	284
32	Radio, television and communication equipment	347	264	307	398	468
34	Motor vehicles, trailers, semi-trailers		86	98	87	116
35	Other transport equipment				188	
36	Furniture; manufacturing n.e.c.	97	77	63	79	108
	Total	**103**	**138**	**173**	**217**	**223**

3.3.3 Value Added per Unit of Capital

The MVA per unit of capital measures the efficiency of fixed assets in the production of output by manufacturing industries as well as its subsectors. Capital stock data are notoriously weak and the fluctuations in this indicator might be due to data problems. In the absence of data problems, changes in this indicator might indicate the (in-) efficient use of capital or a change in technology.

Table 3-11 and Figure 3-11 show MVA per unit of capital. The data show that in comparison to 1991/92, MVA per unit of capital increased in census year 1996/97 and 2001/02, but declined in census year 2006/07 and again increased in census year 2011/12.

Details of MVA per unit of capital by subsector level is given in Table 3-12. MVA per unit of capital of manufacturing industries of food & beverages, wearing apparel & fur and chemicals & chemical products increased till the CME year 2001/02 and fluctuated in the last two CME years. Textiles had good performance for the first two CME years and stagnated in the last three CME years.

MVA per unit of capital of wood products and basic metals decreased for the first three CME years. Since then wood products remained stagnant while basic metals slightly increased in the last two CME years (see Table 3-12). But the indicator of the other industries fluctuated and could not explain its efficiency or inefficiency over the long run.

3.3.4 Value Added Per Output

The MVA/Output ratio by census year shows a substantial decline in each census year.

The value added output ratio measures the intensity of the use of material inputs. Since it is a ratio between two values, the effects of inflation are nearly eliminated making the VA/output ratio a more stable and robust estimate in comparison with the absolute value of output and input. Thus, it is widely applied in order to check the data consistency in survey results.

The value added/output ratio varies significantly according to the sector and subsectors. Generally, it is lower for resource-based sectors, such as agro-industries and basic metals, and higher in technologically-advanced sectors, such as the pharmaceutical industry and machinery production.

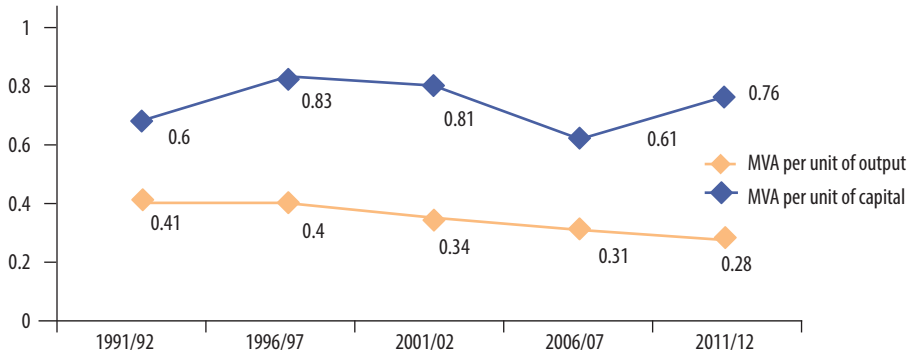
The MVA/Output ratio by census year given in Table 3-11 and Figure 3-11 shows a substantial decline in each census year. The changes in this ratio indicates changes in

the efficiency in the use of inputs (i.e. inputs are at a higher proportion of output), unfavorable prices for products and purchases, or poor control of stocks.

Table 3-11: MVA per unit of output and MVA per unit of capital by manufacturing census year (values are in Rs.'000' at constant price=2000/01)

Census year	No. of estab.	Wages, salaries & other benefits	Gross fixed assets at the end of the year	Output	Value added	MVA/ output ratio	MVA per unit of capital
1991/92	4271	3348493	20067126	32997374	13649922	0.41	0.68
1996/97	3557	4058069	26491045	54927092	21875315	0.40	0.83
2001/02	3213	6389661	40371381	94811061	32604606	0.34	0.81
2006/07	3446	8044096	78889352	155948270	48138548	0.31	0.61
2011/12	4076	16440763	119728060	320756037	90830311	0.28	0.76

Figure 3-11: MVA per unit of output and MVA per unit of capital by manufacturing census year (1991/92-2011/12)



The MVA/Output ratio of the manufacturing subsectors by census year are given in Table 3-12. The MVA/Output ratio of Tobacco is higher than the other industries in all the CME years. Low values for the MVA/Output ratio indicate that material inputs are a large part of the output and the value added processes in the sector are relatively shallow. Basic metal and fabricated metal products have the lowest ratios (0.14 and 0.20 for the year 2011/12). Some of manufacturing industries like textiles, leather, leather products & footwear, chemicals and chemical products, and food & beverages are quite constant in their input use. The MVA/Output ratios of the other subsectors of manufacturing industries have moved up and down throughout the census years and the explanation for the behavior is not straightforward over the long run.

Table 3-12: MVA per unit of output and MVA per unit of capital of census year by manufacturing sub-sector

ISIC3	Description	MVA/Output ratio at constant price					MVA per unit of capital at constant price				
		1991/92	1996/97	2001/02	2006/07	2011/12	1991/92	1996/97	2001/02	2006/07	2011/12
15	Food and beverages	0.33	0.34	0.31	0.25	0.26	0.46	0.72	0.77	0.70	0.89
16	Tobacco products	0.71	0.72	0.81	0.82	0.75	4.04	1.79	6.26	11.55	2.41
17	Textiles	0.43	0.45	0.38	0.30	0.25	0.80	0.98	0.44	0.40	0.40
18	Wearing apparel, fur	0.45	0.36	0.41	0.38	0.31	1.36	1.75	1.87	0.92	0.53
19	Leather, leather products and footwear	0.33	0.35	0.32	0.25	0.27	0.96	1.77	0.99	0.69	0.74
20	Wood products (excl. furniture)	0.43	0.38	0.30	0.29	0.32	2.53	1.09	0.64	0.66	0.66
21	Paper and paper products	0.36	0.35	0.27	0.50	0.30	0.57	0.28	0.24	0.92	0.65
22	Printing and publishing	0.28	0.57	0.46	0.43	0.41	0.38	1.02	0.91	0.64	0.32
23	Coke, refined petroleum products, nuclear fuel		0.24	0.23	0.61	0.31		0.70	1.03	8.74	2.37
24	Chemicals and chemical products	0.38	0.35	0.38	0.44	0.43	0.28	0.57	1.27	0.21	0.84
25	Rubber and plastics products	0.36	0.34	0.29	0.22	0.25	0.98	0.48	0.55	0.54	0.66
26	Non-metallic mineral products	0.63	0.54	0.47	0.32	0.31	0.61	0.77	0.57	0.42	0.39
27	Basic metals	0.25	0.19	0.15	0.22	0.14	1.28	0.77	0.50	0.69	0.76
28	Fabricated metal products	0.27	0.29	0.18	0.18	0.20	0.21	1.00	0.96	1.20	1.48
29	Machinery and equipment n.e.c.		0.38	0.40	0.29	0.35		0.54	1.79	1.41	0.52
31	Electrical machinery and apparatus	0.37	0.28	0.21	0.17	0.27	1.50	1.22	0.82	1.16	1.14
32	Radio, television and communication equipment	0.28	0.41	0.26	0.33	0.35	1.79	0.97	1.83	3.68	0.62
34	Motor vehicles, trailers, semi-trailers		0.28	0.36	0.32	0.37		0.27	0.90	0.48	0.57
35	Other transport equipment				0.38					0.71	
36	Furniture; manufacturing n.e.c.	0.42	0.43	0.39	0.42	0.39	0.80	0.19	0.78	0.55	0.65
21	**Total**	**0.41**	**0.40**	**0.34**	**0.31**	**0.28**	**0.68**	**0.83**	**0.81**	**0.61**	**0.76**

3.3.5 Total Factor Productivity

Factors of production such as labour, capital (i.e. machines), organizational know-how, and management combine to convert inputs into outputs by adding value to the inputs. The value added is thus the product of these factors. Value added can be produced more or less efficiently. Earlier, we discussed partial productivity measures. It is interesting to find a measure of production efficiency (or productivity) that takes into account more than one factor of production. The simplest case is that of labour and capital. Mathematically, the value of labour and the value of capital are combined through a production function. The easiest one to use is the so-called "Cobb-Douglas" function.

$$VA = A \times L^{\alpha} \times K^{1-\alpha}$$

Where:
VA: Value added
L: Value of labour inputs
K: Value of capital used
A: Total factor productivity (TFP)
α: Labour share in total factor costs: L/(K+L)

The percentage change in A (or TFP) measures the increase/decrease in the efficiency of the combined use of labour and capital between two periods. This measure of efficiency is a theoretical construct that provides a first approximation to the notion of efficiency of capital and labour combined.

Table 3-13 shows that there was a continuous decline in total factor productivity. The largest decline was between census year 2001/02 and 2006/07. However, the decline persisted, although at a slower pace. It means that the manufacturing sector underwent changes whereby the same amount of labour and capital produced less value added. This can be the case when there is a sectoral shift towards industries that uses less capital and are more labour intensive. It may also mean that the conditions of production have deteriorated. Production stoppages due to electricity cuts and labour unrest may contribute to this. It may also be a

There was a continuous decline in total factor productivity: a sectoral shift towards industries that use less capital and are more labor intensive; the conditions of production have deteriorated; production stoppages due to electricity cuts and labour unrest have contributed.

combination of these two possible explanations.[1] Section 3.2 has shown that indeed there was a shift toward the food sector, which adds further evidence of a structural change towards lower efficiency.

Table 3-13: Percentage change in total factor productivity (TFP) between census years

Change in sector-wide TFP (in %)				
	1996/97	2001/02	2006/07	2011/12
1996		-1	-37	-45
2001			-36	-45
2006				-13

3.3.6 Share of Training by Census Year and Firm Size

Firms not only invest in capital but also in labour through labour training. Training is required with labour turnover and replacement and for the purpose of upgrading the existing staff.

Larger firms spend more on labour training as percentage of total wages and salaries than smaller firms.

Table 3-14 shows the share of the expenditure on labour training as a percentage of total wages and salaries. Larger firms spend more on labour training as percentage of total wages and salaries than smaller firms. Until 2006/07 firms in class 100-199 spent more on training than the others, but in 2011/12 the largest firm size took the lead, because training expenditure of the 100-199 class declined.

The share of the training cost for size 10-19 and 20-49 decreased over time to reach about 50 per cent of the national average.

1. *The calculations have eliminated capacity utilization as a potential cause for the decline.*

Table 3-14: Share of training as percentage of wages and salaries by firm size and census year

Firm size by employment	Wages, salaries* (in million)				Payment for training* (in million)				Share of training as % of wages and salaries			
	1996	2001	2006	2011	1996	2001	2006	2011	1996	2001	2006	2011
10-19	435	543	658	1021	14	14	13	19	3.1	2.5	2.0	1.9
20-49	565	635	757	1026	22	29	41	27	3.8	4.6	5.4	2.6
50-99	754	743	800	1054	26	57	39	46	3.5	7.6	4.9	4.4
100-199	877	1240	1053	1512	45	78	65	57	5.1	6.3	6.1	3.8
> 200	2160	2998	2882	3254	71	168	146	169	3.3	5.6	5.1	5.2
Total	**4792**	**6157**	**6151**	**7867**	**177**	**345**	**304**	**318**	**3.7**	**5.6**	**5.0**	**4.0**

*Values are in constant price (2000/01)

3.4 Competitiveness

Sustainable development of the manufacturing sector crucially depends on the improvement of its competitive position in relation to imports and exports. Since the rest of the world is continuously moving forward, improving the competitive position is a highly dynamic process. The export performance of the manufacturing sector is analyzed by tracing the export performance of its sub-sectors (Section 3.4.1) and by comparing the overall manufacturing export performance to a select group of countries in the wider region (Section 3.4.2).

In addition to the data provided by various censuses, this section also relies on other data sources, particularly for comparison with the other countries.

3.4.1 Export Performance by Manufacturing Sub-sectors

Several sectors stand out as export-oriented manufacturers with more than 50 per cent of their output exported. These sectors are textiles, wearing apparel & fur, and leather & leather products & footwear. Other sectors that have sizeable exports (between 25 and 50 per cent) are rubber & plastic product and basic metals. However, sectors (such as food and beverages) that have low exports as percentage of their output might still be strong exporters in the absolute sense if they are very large sectors. This can be seen in the next table (Table 3-16).

Table 3-15: Exports as percentage of output by sub-sector and census year

ISIC3	Description	Export as per cent of output			
		1996	2001	2006	2011
15	Food and beverages	7.1	27.2	17.4	5.7
16	Tobacco products	0.0	0.0	0.0	1.5
17	Textiles	56.1	67.1	64.9	59.7
18	Wearing apparel, fur	96.3	95.2	73.1	45.0
19	Leather, leather products and footwear	58.0	54.8	54.2	44.3
20	Wood products (excluding furniture)	0.3	0.3	10.8	4.2
21	Paper and paper products	5.0	17.6	5.6	0.6
22	Printing and publishing	0.0	1.6	2.6	0.5
23	Coke, refined petroleum products, nuclear fuel	0.0	0.0	8.4	0.0
24	Chemicals and chemical products	41.9	56.0	29.2	9.7
25	Rubber and plastics products	1.5	24.6	48.9	28.8
26	Non-metallic mineral products	1.4	1.3	3.3	2.6
27	Basic metals	1.2	39.4	34.5	23.8
28	Fabricated metal products	2.2	22.0	33.2	2.7
29	Machinery and equipment n.e.c.	0.3	0.0	0.0	0.0
31	Electrical machinery and apparatus	7.8	42.4	10.8	5.7
32	Radio, television and communication equipment	0.5	0.1	0.2	0.0
33	Medical, precision and optical instruments				
34	Motor vehicles, trailers, semi-trailers	0.0	0.0	0.0	0.0
35	Other transport equipment			59.3	0.0
36	Furniture; manufacturing n.e.c.	0.5	6.7	2.5	0.3
	Total	**25.7**	**35.2**	**25.9**	**10.7**

The sectoral composition of Nepal's manufactured exports by sub-sector and census years is given in Table 3-16. The data are arranged in the descending order using the census year 2011.

Over the years, there have been large changes in the shares of all exporting sectors. In the year 2011/12 textiles took the lead over food & beverages as the largest exporter.

Table 3-16: Share of exports in total manufactured exports by sub-sector and census years (1996/97 - 2011/12)

ISIC3	Description	Share of Exports in Total Manufactured Exports (in %)			
		1996/97	2001/02	2006/07	2011/12
17	Textiles	5.3	49.6	21.2	26.2
15	Food and beverages	26.4	7.4	27.1	22.2
28	Fabricated metal products	20.3	0.6	6.1	16.0
25	Rubber and plastics products	7.7	0.2	3.2	11.1
27	Basic metals	20.9	0.2	5.6	9.6
24	Chemicals and chemical products	5.2	11.1	14.7	6.5
18	Wearing apparel, fur	0.3	25.9	16.5	3.2
19	Leather, leather products and footwear	0.5	3.3	2.1	1.6
26	Non-metallic mineral products	9.2	0.3	0.2	1.0
	All others	4.3	1.4	3.4	2.6

Fabricated metal products and basic metals combined stand at a share of 25.5 per cent and rivals the textile sector in 2011/12. A relatively large share of rubber & plastic products is interesting to observe.

Exports in Nepal are highly dependent on the success of one or two sectors. Table 3-17 below shows the fate of the once successful carpet exports - the quantity exported declined from about 25 million square meters in 1999/2000 to 4.8 million square meters in 2012/13. However, the total export value declined only by 57 per cent between 1999/2000 and 2012/13 because of the higher value per unit.

Table 3-17: Carpet exports from Nepal, fiscal year 1999/2000-2012/2013

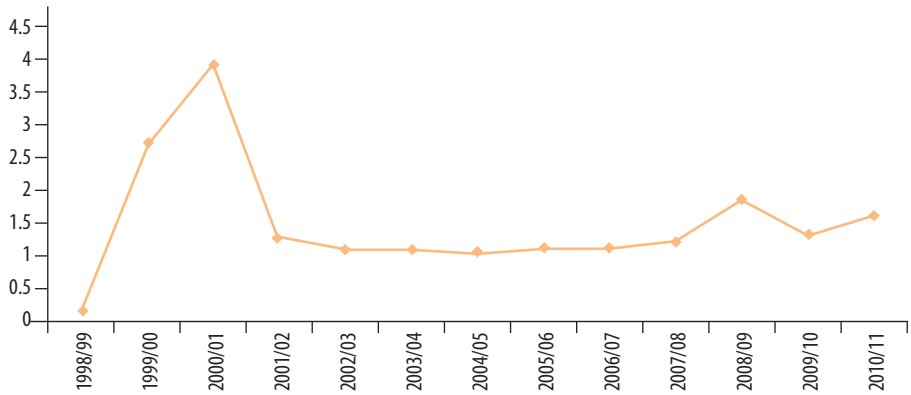
Fiscal Year	Quantity in m^2	Value in US$
1999/00	25,09,452.43	142,365,151
2000/01	22,42,692.93	117,466,682
2001/02	16,93,196.75	81,655,133
2002/03	1,566,950.17	68,089,183
2003/04	1,617,766.51	75,288,842
2004/05	16,64117.71	82,929,229
2005/06	1,484,484.42	79,745,809

Fiscal Year	Quantity in m2	Value in US$
2006/07	1,341,757.00	79,375,420
2007/08	11,49,895.94	84,864,737
2008/09	8,81,757.46	70,206,073
2009/2010	6,81,000.00	5,15,60,000
2010/2011	6,97,121.84	60,674856
2011/012	6,21,771.29	70,650,906
2012/013	4,79,277.44	61,011829

Source: http://nepalcarpet.org/index.php?page=export

A similar dynamics occurred with the pashmina shawls (Figure 3-12). With a peak of 4.5 billion rupees in 1998/99, exports declined to approximately 1.5 billion rupees in 2010/11.

Figure 3-12: The fate of pashmina shawls exports



Source: Trade and Export Promotion Center, Nepal

Basic metals and fabricated metal products show strong fluctuations, but in the last census year their export share in total manufactured exports stood at 9.6 and 16 per cent respectively. The export success of these sectors is carried by steel & iron products (see Table A-4). In 2009, the latter stood at 9,594 million rupees, increased to a peak of 11,745 million rupees in 2012, and reached 5,603 million rupees in the first six

months of the fiscal year 2013/14.[2] Given its non-traditional character, it is a promising development.

However, the above figure do not present the net impact of these exporting sectors on the balance of payments since they must also import some or most of the raw materials. Table 3-18 below calculates the sub-sectoral shares based on the net effect by deducting the value of imported inputs from the export proceeds. The overall picture changes quite significantly. Food & beverages make it to the top of the list, while textiles now takes the second place. Fabricated metal products and basic metals combined come to 7.8 per cent and drop to the fourth place behind rubber & plastic products. Leather, leather products & footwear move from the eighth to the fourth place.

Table 3-18: Share of net exports in total net manufactured exports by sub-sector by sector by census year 1996/97 to 2011/12

ISIC3	ISIC3 Description	Share of net exports in total net manufactured exports in per cent			
		1996	2001	2006	2011
15	Food and beverages	9.0	31.6	29.8	30.2
17	Textiles	60.4	25.6	29.2	26.7
25	Rubber and plastics products	0.1	2.5	7.9	12.5
19	Leather, leather products and footwear	4.1	3.0	2.4	6.5
24	Chemicals and chemical products	7.9	13.9	7.7	6.0
26	Non-metallic mineral products	0.4	0.3	1.3	4.8
27	Basic metals	0.1	2.8	6.2	4.6
28	Fabricated metal products	0.4	3.0	8.9	3.1
18	Wearing apparel, fur	16.7	14.6	3.3	3.1
20	Wood products (excluding furniture)	0.0	0.0	1.0	1.4
	All others	1.0	2.8	2.0	1.3

Note : Net exports is defined as 'exports minus imported inputs.'

2. *Source: Trade and Export Promotion Center: http://efourcore.com.np/tepcdatabank/chapterwiseallcommodities.php*

The Government identified in the Nepal Trade Integration Strategy 2010 (NTIS)[3] iron and steel products, among 19 exportable products, as exportable items (including agro-food and services) having comparative advantage . All the manufacturing sectors listed as priority export sectors are: noodles, handmade paper, silver jewellery, iron and steel, pashmina, and wool products. Dairy products were mentioned as an additional potential export sector. The analysis above shows that the top four sectors in Table 3-18 demand further consideration.

3.4.2 International Comparison of Nepal's Competitive Position

Competitiveness of the manufacturing sector of Nepal is compared to a select countries in Asia in terms of the Competitive Industrial Performance Index (UNIDO) and the Global Competitiveness Index (World Economic Forum). The difference between the two is that the Global Competitiveness Index (GCI) focuses on the conditions of production and trade, whereas the Competitive Industrial Performance Index (CIP) measures the actual relative performance of the manufacturing sector. The GCI can provide explanations to the CIP.

The Competitive Performance Index is composed of three sub-indices: (a) capacity to produce and export (manufacturing value added per capita and manufacturing exports per capita), (b) technological deepening (measuring the level of technology of manufacturing production) and upgrading (measuring the technological level of manufactured exports), and (c) the world impact (measuring the share of manufacturing value added and trade in the world total).

The Global Competitiveness Index is composed of an index of institutions, infrastructure, macroeconomic environment, and health and primary education. Within these, infrastructure is an important bottleneck for Nepal.

The competitive performance of Nepal as measured by the CIP is very low (119th out of 135 countries). Nepal's per capita manufacturing value added, share of manufacturing value added in the GDP, share of world manufacturing value added, and share of medium- and high-technology activities in total manufacturing value added are by far the lowest amongst the group of countries compared (Table 3-19 and Table 3-20).

3. *Ministry of Commerce and Supplies: www.mocs.gov.np/uploads/NTIS%202010%20exe%20sum%20160610.pdf*

The size of the manufacturing sector as percentage share of GDP is the lowest of all. This is another indication of the poor competitiveness of the sector. Over time (from 2001 through 2008 to 2011), the manufacturing sector's share declined from 9.0 through 7.51 to 6.41 per cent (see also Table 3-2).

The share of medium- and high-technology activities in total manufacturing value added declined significantly - from 9.13 in 2008 to 1.98 in 2011. However, the data in Table 3-2 shows that structural change was limited and that this substantial decline is likely to be a mistake and the share of medium- and high-technology value added should be closer to 10.98 per cent. Only Cambodia is considerably lower with 0.26 per cent share and is thus specializing in low technology exports.

Table 3-19: Indicators of industrial performance (value added) by selected regional economies (2006 and 2011)

Country	Manufacturing value added per capita (2005 $)		Share of manufacturing value added in GDP (per cent)		Share of world manufacturing value added (per cent)		Share of medium- and high-technology activities in total manufacturing value added (per cent)	
	2008	2011	2008	2011	2008	2011	2008	2011
Nepal	23	22	7.51	6.41	0.01	0.01	9.13	1.98
Thailand	963	1108	34.96	36.66	0.82	NA	46.16	46.16
India	116	158	14.78	14.89	1.70	2.25	34.14	37.27
Cambodia	97	127	18.88	19.51	0.02	0.02	0.26	0.26
Malaysia	1639	1673	29.84	26.73	0.55	0.55	48.95	41.76
Bangladesh	74	101	16.48	17.58	0.13	0.17	20.20	20.20
Pakistan	129	142	17.90	18.04	0.26	0.29	24.57	24.57

Source: Industrial Development Report 2013, UNIDO

Nepal's manufactured exports per capita stood at 22 and 24 US dollars in 2008 and 2011[4] respectively. Although there is a slight improvement in 2011 as compared to 2008, it is still very low in comparison with the other countries. Manufactured export share in total exports are in line with the group compared to. Surprisingly, the share

4 *This seems to contradict the data on manufacturing value added per capita in Table 6 1 but exports are measured by total output and value added is output minus inputs.*

of the manufactured exports in world manufactured exports is the same as that for Bangladesh, but both are very small. However, it is encouraging to note that the share of medium-and high-technology activities in manufactured exports increased from 9.18 in 2008 to 19.60 in 2011.[5]

Table 3-20: Indicators of industrial performance (exports) by selected regional economies (2006 and 2011)

Country	Manufactured exports per capita (2005 $)		Share of manufactured exports in total exports (per cent)		Share of world manufactured exports (per cent)		Share of medium- and high-technology activities in manufactured exports (per cent)	
	2008	2011	2008	2011	2008	2011	2008	2011
Nepal	22	24	87.02	79.62	0.01	0.01	9.18	19.60
Thailand	1677	2696	86.41	81.90	1.50	1.27	62.36	58.53
India	90	202	85.95	83.34	1.17	2.01	23.18	27.67
Cambodia	210	335	79.57	71.46	0.03	0.04	2.44	7.06
Malaysia	5109	6385	84.54	81.18	1.53	1.47	70.81	59.11
Bangladesh	232	230	83.28	63.66	0.01	0.01	25.70	21.60
Pakistan	93	115	89.29	80.67	0.17	0.16	7.67	10.94

Source: Industrial Development Report 2013, UNIDO

The Global Competitive Index (GCI) of Nepal is very low – 117, roughly the same as the Competitive Industrial Performance Index – 119.

The global competitive position of Nepal as measured by the GCI is also very low-117. The GCI is roughly the same as the CIPI-119 (see Table 3-21).

Overall, global competitiveness of Nepal improved in 2013/14 as compared to 2012/13. However, it is still ranked 117th among 148 countries and the ranking is the third from the bottom in the region, with only Pakistan and Myanmar trailing behind Nepal.

5 *This supports the likeliness of the mistake in Table 6 1 referred to earlier.*

Table 3-21: The Global Competitiveness Index (2013-2014) and Competitive Industrial Performance Index (2010)

Country/ Economy	GCI 2013-2014		GCI 2012-2013		CIP ranking (2010)
	Rank	Score	Rank	Change	
Malaysia	24	5.03	25	1	21
Thailand	37	4.54	38	1	23
India	60	4.28	59	-1	43
Lao PDR	81	4.08	n/a	n/a	
Cambodia	88	4.01	85	-3	90
Bhutan	109	3.73	n/a	n/a	
Bangladesh	110	3.71	118	8	78
Nepal	117	3.66	125	8	119
Pakistan	133	3.41	124	-9	74
Myanmar	139	3.23	n/a	n/a	

Source : GPI – World Economic Forum 2013, www.weforum.org/gcr,
CIP – UNIDO, Competitive Industrial Performance Report 2013
Note : CIP ranking has no data on Laos, Bhutan, and Myanmar.

The problems of doing business in Nepal are further detailed in Table 3-22. The costs to export and import are high in Nepal but they are even higher for Laos and Bhutan. Moreover, the time required to export and import is the highest for Nepal. Of course, Nepal being landlocked, explains why more time is required, but improvement in other activities around exports and imports such as licensing, customs procedures and transport efficiency could minimize the trade cost arising from these long lead times. As it is, the logistics performance is the lowest amongst countries in the table.

High import costs provide a form of protection for domestic industries geared towards the domestic market, especially when the share of domestic value added in final output for the whole value chain is high. This is the case for agro-based industries.

High import costs are problematic for industries with high import content, particularly in weight losing production processes. On the other hand, high import costs can provide a form of protection for domestic industries geared towards the domestic market, especially when the share of domestic value added in the final output for the whole value chain is high. This is the case for agro-based industries and provides an explanation for the relative success of the food sector.

Contrary to expectations for a country that has agriculture as its largest sector in the GDP, manufactured exports are a very large proportion of total exports: 79.62 per cent.

Exports of goods and services of Nepal stand at 10 per cent of the GDP. Again, this is the lowest in the group. Contrary to the expectations for a country that has agriculture as its largest sector in the GDP, manufactured exports make a very large proportion of total exports: 79.62 per cent in 2011 (see Table 6-4 and Table A-3).

Table 3-22: Indicators of competitiveness (2012)

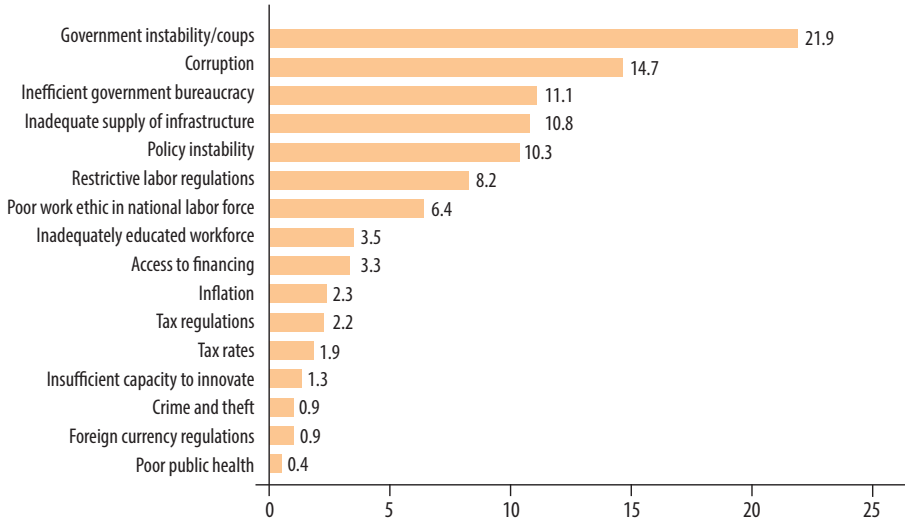
2012	Nepal	Thailand	India	Laos	Cambodia	Buthan	Bangladesh	Pakistan	Myanmar
Exports of goods and services (% of GDP)	10.0	71.4	23.8	n.a.	54.6	37.1	23.2	12.3	14.6
Cost to export (US$ per container)	1975	585	1120	2140	755	2230	1025	660	670
Cost to import (US$ per container)	2095	750	1200	2125	900	2330	1430	705	660
CPIA business regulatory environment rating (1=low to 6=high)	3	n.a.	3	3.5	3.5	3.5	3.5	3	n.a.
CPIA trade rating (1=low to 6=high)	3.5		4	4	4.5	3	3.5	3.5	
Ease of doing business index (rank)	103	18	131	163	135	146	132	106	182
Logistics performance index: Overall (1=low to 5=high)	2.04	3.18	3.08	2.50	2.56	2.52	2.74	2.83	2.37
Time to export (days)	41	14	16	25	22	38	25	21	25
Time to import (days)	38	13	20	26	26	38	34	18	27

Source: World Development Index Tables (2013) and Asian Development Bank key indicators for Asia and the Pacific (2013)

All the indicators for Nepal in Table 3-22 provide further explanation to the lackluster performance of the manufacturing sector. The World Economic Forum provides a summary of what business persons view as the most pressing problems in doing

business (Figure 3-13). At the top of the list are three factors relating to the efficiency and effectiveness of the governance system. This is followed by inadequate infrastructure, policy instability and restrictive labour regulations.

Figure 3-13: World Economic Forum overview of problems doing business in Nepal



Note: From the list of factors above, respondents were asked to select the five most problematic for doing business in their country and to rank them between 1 (most problematic) and 5. The bars in the figure show the responses weighted according to their rankings.

Source: World Economic Forum, Global Competitiveness Report 2013

3.4.3 Conclusions

The Nepal Trade Integration Strategy aims at diversification of exports. This is, of course, a necessary strategy. At the same time, export deepening in terms of higher value added by domestic production of (otherwise imported) inputs (backward linkages) or by further processing of output (forward linkages) results in more foreign exchange earnings, improved competitive position and technological learning.

Export deepening in terms of higher value added by domestic production of (otherwise imported) inputs or by further processing of output results in more foreign exchange earnings, improved competitive position and technological learning.

In terms of net exports, the top exporting sectors in the year 2011/12 were food & beverages, textiles, rubber & plastic products, and leather, leather products & footwear. These sectors deserve further consideration in the industrial policy. More information, face-to-face interaction with producers, and applied research are needed to formulate appropriate policies for further development of these sectors, to identify products (within these sectors) with potential for export, best practice producers, and to analyze all elements of the value chain that affect quality and competitiveness.

The basic metals and fabricated metal products sectors are strong exporters, but their net exports are considerably lower due to large requirements for imported input. Yet these are non-traditional medium-to-high technology exporters and have the promise of further product development. As such, their importance in the Nepal Trade Integration Strategy seems justified.

The Global Competitive Index (GCI) and Competitive Industrial Performance Index of Nepal are very low: 117 (out of 148) and 119 (out of 135) respectively. Many of the problems experienced by entrepreneurs are in the field of governance. Other major obstacles to improve competitiveness are the unreliable electricity supply and poor labour-employer relations.

A competitive domestic industrial base, in an open trade environment, is a stepping stone for local industries to penetrate the export market. The objectives of the industrial Policy of 2010 and Nepal Trade Integration Strategy 2010 could easily be integrated and harmonized.

Policies that aim to increase foreign exchange earnings by enhancing competitiveness of the domestic productive sector must focus on competition in traded goods, e.g. exports as well as import substitutes. Since the trade balance of Nepal is highly negative (the value of imports is more than six times the value of exports), enormous potential exists in improving competition with imports. A competitive domestic industrial base, in an open trade environment, is a stepping stone for local industries to penetrate the export market. The objectives of the Industrial Policy 2010 and Nepal Trade Integration Strategy 2010 could easily be integrated and harmonized.

4 MANUFACTURING IMPACT

Following the review of the performance of the manufacturing sector in the previous chapter, this chapter now turns to describe and analyze the impact of the manufacturing sector on gender, regional distribution of industries and the environment.

Since the manufacturing sector in Nepal is small and not dynamic, it cannot be expected to play a strong role in mitigating economy-wide imbalances. Imposing too many constraints on the sector may be counter-productive in the long run. Yet, good labour relations, gender equality and environmental health can be pursued simultaneously with modern developments in manufacturing. Regional dispersion of industries should not be a short-term policy objective. Early industrial development is generally stimulated by concentration , reaping economies of scale and conglomeration and allowing support industries and services to develop.

4.1 Social Inclusiveness

4.1.1 Introduction

The unequal distribution of the country's resources between individuals and groups in society in terms of region, caste/ethnicity and gender can give rise to social exclusion. It can be measured by various indicators. It may include multidimensional poverty, inequality, equity, social cohesion, and empowerment. Here, only the disparity in terms of gender and geographic region in the formal manufacturing sector is highlighted.

Social inclusiveness is an important issue in the informal sector but the formal manufacturing sector also provides some striking facts. For example, for around 20 years the proportion of women workers has been constant. Large wage gaps are also a problem in the formal sector and recent census data show that the wages gap became larger.

The Human Development Index for Nepal is 0.463 which unfavorably compares with Bhutan 0.538, Pakistan 0.515, India 0.554, Sri Lanka 0.715, Bangladesh 0.515, and the Maldives 0.688.

The Gender Inequality Index for Nepal is 0.485 (rank 102) whereas for the other countries of the region the indices are: Bhutan 0.464 (rank 92), the Maldives 0.357 (rank 64), Bangladesh 0.518 (rank 111), India 0.610 (rank 132), Pakistan 0.567 (rank 123), and Afghanistan 0.712 (rank 147).[6]

4.1.2 Gender Employment Status of the Manufacturing Sector

The per cent of women workers as percentage of the total workforce is one of the indicators to measure social inclusion. In all of the four manufacturing and establishment census years, less than 20 per cent women are working. Table 4-1 shows that out of the total manufacturing employment, around 5 per cent women are working as administrative workers and less than 5 per cent women as technical workers from 1996/97 to 2011/12. The highest percentages of female workers are engaged as operative workers in all the CMEs.

Table 4-1: Number of paid employees by sex and type of employment (1996/97-2011/12)

Census Year	Administrative			Technical			Operative worker			Total		
	Male	Female	% Female	Male	Female	% Female	Male	Female	% Female	Male	Female	% Female
1996/97	17668	915	4.9	5561	221	3.8	123668	39283	24.1	146897	40419	21.6
2001/02	20522	1166	5.4	10585	243	2.2	116902	32525	21.8	148009	33934	18.7
2006/07	19268	1362	6.6	8381	364	4.2	112830	27686	19.7	140479	29412	17.3
2011/12	19142	1089	5.4	9416	298	3.1	130618	34426	20.9	159176	35813	18.4

4.1.3 Wage Gap Ratio (2006/07 and 2011/12)

The wage gap ratio is one of the tools to measure inequality between males and females. If this ratio is 100, there is no disparity between male and female wages. If it is less than 100, it means that, on average, women earn less than men.

The basic way to look at differences in pay in gender terms is to look at the mean or median

With a few exceptions female wages are lower than male wages. In census year 2011/12, the wage gap is almost 20 per cent.

wages of men and women. However, this comparison needs to be treated with caution because men and women exhibit very different characteristics for many of the factors that affect pay. For example, men tend to choose fields and hazardous work with higher average pay, and tend to work more hours per week. Thus, in order to determine what effect discrimination has upon the wages of men and women in the workplace the differences in career options must be accounted for. However, the mean and median wages of men and women are useful starting points for further analysis.

Table A-7 shows the female/male ratio of mean wages as a percentage. The mean male/female wages are calculated as the total male/female wages divided by the number of male/female employees. This gives the female wage gap.

In all the cases, the female wages are lower than male wages, with the exception of tobacco products from 2001/02 onwards, food & beverages in 2006/07, wood products in 1996/97, fabricated metal products in 2006/07, coke, refined petroleum products, nuclear fuel in 2011/12 and machinery & equipment n.e.c. in 2001/02. The reason for these exceptions is not immediately clear.

In 2006/07, the overall manufacturing wage gap ratio was low at 90.4 per cent, but in 2011/12, the wage gap ratio was 81.3 per cent.

Coke, refined petroleum products, nuclear fuel, machinery & equipment n.e.c, radio, television & communication equipment, medical, precision & optical instruments, motor vehicles, trailers, semi-trailers, and other transport equipment have no consistent data because the number of firms is very low and no solid conclusions can be drawn.

To remove extreme values that might distort the picture derived from the mean values, the ratio of median value was calculated (graph in Figure 4-1, summary in Table 4-2 and details in Table A-8). Figure 7-1 shows that most coloured bars are below 100 (which means that women's wages are lower than men's wages in those sectors and for those years). The results are not so different from mean ratios.

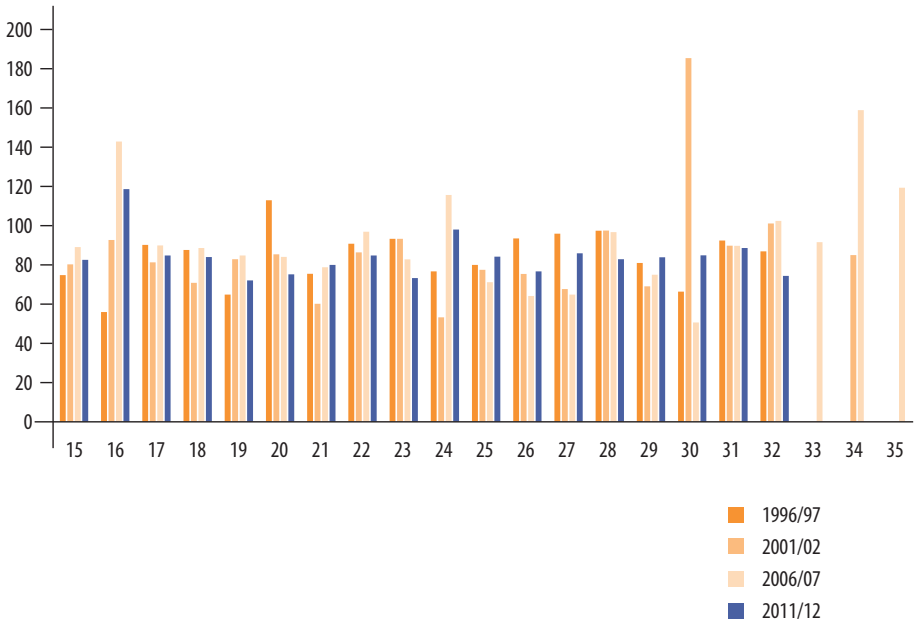
Table 4-2 also shows that the female/male median ratio in medium-low technology industries is the lowest in all census years.

Table 4-2: Median wage ratio of female to male workers by NSIC as percentage of male workers

NSIC rev3	Description	Ratio (%) median wage of female to men's 1996/97	Ratio (%) median wage of female to men's 2001/02	Ratio (%) median wage of female to men's 2006/07	Ratio (%) median wage of female to men's 2011/12
1	Low technology*	86.7	81.7	88.5	80.2
2	Medium-low technology*	78.0	64.8	61.1	74.5
3	Medium-high and high technology*	83.1	84.3	79.2	84.2
	Total	**87.5**	**81.9**	**85.7**	**82.9**

* For the categories of technology, please refer to Table A-8

Figure 4-1: Wage gap ratio (per cent of median wage of female to male) by sector and census year



4.1.4 Regional Parity Index

The regional (district) parity index measures inequality in the distribution of value added and employment between districts. It is interesting to look at the locational distribution of industries to appreciate the impact on district-wise employment and income opportunities.

Nepal has 75 districts that form the basis of the analysis. Out of the total 75 districts, 20 districts lie in the Tarai, 39 districts lie in the hills and 16 districts lie in the mountains. Almost all Nepalese economic activities are concentrated in the Tarai and the hills. The capital city of Nepal lies in Kathmandu district. Rupandehi, Bara, Morang and Kaski districts have large urban centers, where there are more economic activities.

Kathmandu has lost its first position to Bara district for the number of manufacturing establishments.

Kathmandu has lost its first position to Bara district for the number of manufacturing establishments. According to Table 4-3, in 1996/97, Kathmandu had the highest share of value added (26.5%) and Bara district had the second highest share (16.8%). But in 2001/02, Bara had the highest share (26.9%) and Kathmandu had the second highest share (11.8%). Similarly, in 2006/07 Bara had the highest share (25.6%) and Kathmandu and Nawalparasi had the second highest share (9.6%). Moreover, in 2011/12 Bara had the highest share (30.8%) and Rupandehi had the second highest share (9.7%). The rest of the districts had only about 8.8 per cent share of the contribution to the value added in census year 2011/12. This highlights the unequal distribution of industries over the districts.

The easiest way to appreciate the degree of inequality is by inspection of the Lorenz curves in Figure 4-2 and Figure 4-3. Figure 4-2 shows the distribution of per capita value added. For example, the blue line in Figure 4-2 shows that 80% of the districts have less than 20% of the total value added per capita. The first 40% of the districts have virtually no share in per capita value added. Likewise, Figure 4-3 shows that 80% of the districts have slightly more than 20% of the total per capita employment. Thus, the Lorenz curve plots the proportion of the total share of per capita value added (y axis) against the cumulative share of the number of districts (x axis).

Figure 4-3 shows the per capita employment distribution at the district level as per the CME 2011/12. Cumulative share of employment per capita is more homogeneous than

cumulative per capita value added. That means per capita value added is more unequally distributed than employment. This might be because rural industries are more labour intensive, they have relatively higher employment as compared to value added.

Table 4-3: Per cent distribution of value added in different CME years by districts

SN	District name	Years			
		1996/97	2001/02	2006/07	20011/12
1	Bara	16.8	26.9	25.6	30.8
2	Rupandehi	1.8	2.4	4.3	9.7
3	Morang	8.6	10.0	8.4	9.2
4	Kathmandu	26.5	11.8	9.6	8.6
5	Nawalparasi	3.2	6.7	9.6	6.9
6	Parsa	3.7	3.5	7.4	4.0
7	Sunsari	3.4	9.9	5.2	3.7
8	Makwanpur	6.0	7.2	6.1	3.7
9	Chitawan	4.1	3.6	1.3	3.2
10	Bhaktapur	1.7	1.0	1.2	2.8
11	Banke	1.6	1.7	1.5	2.4
12	Kapilbastu	0.2	1.0	1.3	1.9
13	Kaski	1.2	0.9	1.2	1.5
14	Jhapa	0.9	1.6	1.5	1.5
15	Lalitpur	10.1	3.8	2.0	1.2
16	Others	6.0	5.2	4.6	8.8

Figure 4-2 : Lorenz curve of per capita value added in 2011/12 by districts

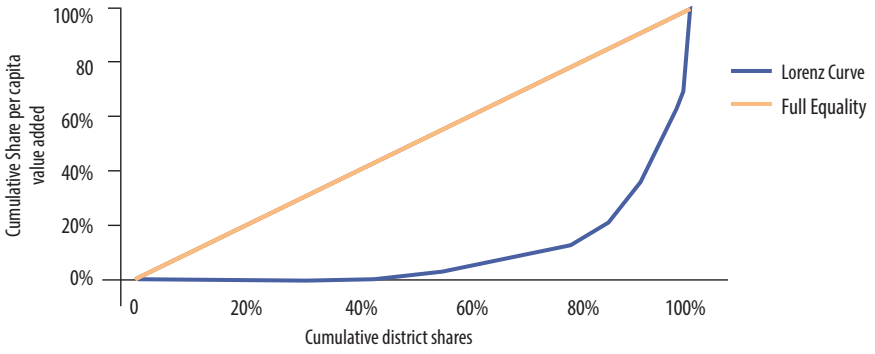
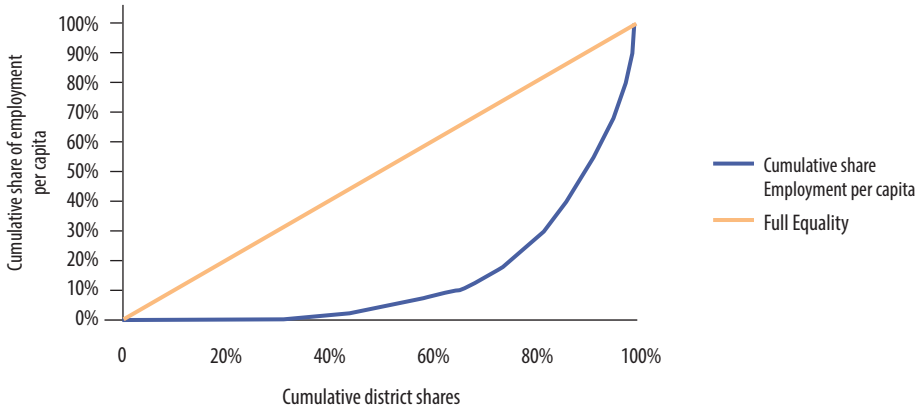


Figure 4-3 : Lorenz Curve of per capita employment in 2011/12 by districts



The Gini coefficient measures the inequality among values of a frequency distribution. A Gini coefficient of zero expresses perfect equality and one expresses maximal inequality. In the graph of the Lorenz Curve, it can be understood as the ratio between the area under the orange line and the area between the orange line and the blue line. If the blue line coincides with the orange line (implying that all districts are equal) the ratio becomes zero. On the other hand, if only one district has all the value added per capita, the blue line becomes zero until it reaches 100% on the horizontal axis when it suddenly increases to 100% and meets the orange line. When the area between the blue and the orange lines becomes equal to the area under the orange line their ratio becomes one: full inequality.

The right hand column of Table 4-4 shows the Gini coefficient for the distribution of per capita value added of the district population for the four census years. The Gini coefficient in per capita value added in CME 2011/12 was 79 per cent indicating the high degree of inequality of per capita value added over the districts.

The current level of Gini coefficient (0.79) is lower than that of the other CMEs, indicating a slightly less unequal distribution of per capita value added over the districts. In CME 2001/02, the Gini coefficient was the highest (0.86).

Table 4-4 also gives the Gini coefficient of distribution of per capita employment by districts. The Gini coefficients for employment per capita are all lower than those for value added, confirming what could be seen in the graphs of the Lorenz Curve. The current level of Gini coefficient (0.71) is lower than that of the other CMEs. From CME 1996/97 to CME 2011/12 the Gini coefficient consistently decreased.

Table 4-4 : Measures of inequality of per capita valued added between districts

CME Year	Gini per capita employment between districts	Gini per capita value added between districts
1996/97	0.77	0.83
2001/02	0.75	0.86
2005/06	0.70	0.82
2011/12	0.71	0.79

4.2 Environmental Footprint from the Census of Manufacturing Establishments

4.2.1 Resource Efficiency in Manufacturing Sector and Sub-sectors

Sustainable use of resources is a major agenda in most of the countries. Environment policies and instruments focus primarily on compliance with regards to emissions, energy efficiency and the reduction of waste and wastewater. In developing countries like Nepal, sustainable use of resources in the manufacturing sector has been a challenge. Efforts have been imposed to reduce emissions and efficient use of resources. Although industries and factories are important for the economic development, prevention and minimization of industrial pollution are of great concern for sustainable development.

Environment management addresses problems in solid waste management, treats waste water,reduces air pollution, and ensures recycling and continuous improvements in energy efficiency. Recycling and resource efficiency improve competitiveness and are environment-friendly.

4.2.2 Material Intensity in Manufacturing Establishment

This section derives the material intensities by census years in the period from 1996 to 2012. Material intensity is the use of material resources per unit of output. Mathematically it is defined as

$$\text{Material Intensity (MI)} = \frac{Material\ input\ (Mi)}{Output\ (Yi)}$$

Material input (Mi) = Value of raw materials purchased + Value of opening stock of raw materials – Value of closing stock of raw materials
Output (Yi) = Value of product sold or shipment value + Value of closing stock of semi-finished and fully-finished goods – Value of opening stock of semi-finished and fully-finished goods

The MI shows the crude measure of the value added margin in different industrial sectors in terms of resource input and output.

4.2.2.1 Analysis of Material Intensity (1996/97-2011/12)

Table A-13 provides the general trend of material intensity by sectors from 1996/97 to 2011/12. On the whole, material intensity of Nepal has increased from Rs 55.12 of material input to achieve the output value of Rs. 100 in 1996/97 to Rs. 66.05 in 2011/12 (see also Figure 4-4).

The indicator shows that most of the sectors have a high material intensity with a value of more than 50% except for the non-metallic mineral products and tobacco sector. Among the sectors in 2012, basic metal has the most intensive material use with the value of 80.04, followed by fabricated metal products (76.81), food and beverages (71.55), electrical machinery and apparatus (71.48), while tobacco products have the lowest value of 23.8, which may be the result of taxes (see Table A-13).

While food and beverages mainly use domestic inputs from agriculture, basic metal and fabricated metal products import most of their raw materials.

Figure 4-4: Trend of material intensity in total manufacturing, 1996/97-2011/12

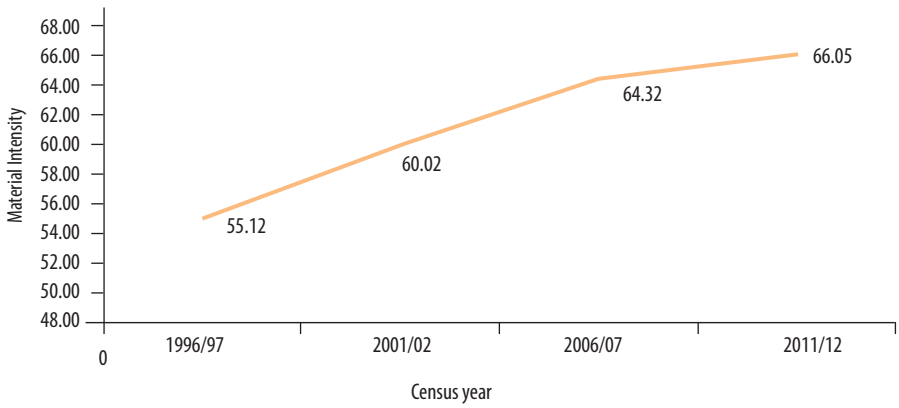
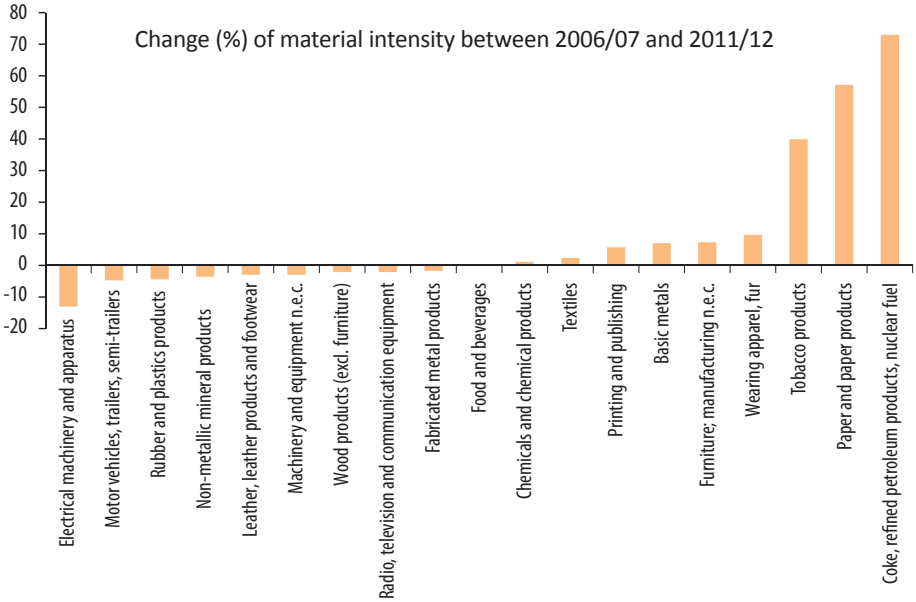


Figure 4-5 reveals the change in pattern of material intensity between 2006/07 and 2011/12. Material input cost increased in food and beverages, chemicals & chemical products, textiles, printing & publishing, basic metals, furniture, manufacturing n.e.c.,

wearing apparel & fur, tobacco products, paper & paper products, and coke, refined petroleum products and nuclear fuel.

Figure 4-5: Percentage change of material intensity between 2006/07 and 2011/12



4.2.3 Energy Efficiency in Manufacturing Sector and Sub-sectors

Energy conservation has emerged as one of the major issues in recent years. Conservation and efficient utilization of energy resources play a vital role in narrowing the gap between demand and supply of energy. Thus, improving energy efficiency is one of the most desirable options.

Basically, energy efficiency describes the ratio between the benefit gained and the energy used. Energy efficiency is either denoted as energy intensity or (reciprocal) as energy productivity. Energy input is related to monetary output parameters. The energy intensity can be stated as primary energy consumption per unit of output or gross domestic product.

Industry is the major sector for primary energy consumption and energy-related carbon dioxide emissions. Energy efficiency in manufacturing industries improves the

competitiveness of the industry. Improving energy efficiency in industry is one of the most cost-effective measures to decelerate the link between economic growth and environmental degradation, such as climate change. To assess the energy efficiency, particular attention is paid to energy intensity.

Energy Intensity is defined as the amount of energy consumed for generating one unit of output. In general, energy intensity is the ratio of energy use to output. This simple ratio provides an indicator of the efficiency of energy use.

4.2.3.1 Methodological Aspect of Aggregating Energy Intensity

Most manufacturing establishments use different energy sources like firewood, diesel, petrol, LP gas, charcoal, electricity, etc. To derive the energy use by manufacturing establishments two measures of total energy use were calculated: one that relies on the thermal content (Joules) of each energy source, and another based on monetary values. In the thermal content (Joules) method, the quantities of each energy source are aggregated into total energy used on the basis of their respective thermal content in the per unit fuel sources.[7]

In the value method, the monetary value of each fuel type is aggregated into total monetary values used on the basis of their respective values purchased in the reference period. The monetary values of change in stocks of fuel and electricity purchased or generated for use other than sale purpose is added to get total monetary values of energy used in the industry.

The energy intensity indicator is the ratio of energy consumed to output.

Mathematically,

$$\text{Energy Intensity (EI)} = \frac{Energy\ input\ (Ei)}{Output\ (Yi)}$$

The energy input is measured in Mega Joules (MJ) in thermal content approach and in monetary values in the price approach.

7. Given the nature of information of the census, monetary values of different energy sources were converted into diesel quantities and these were converted into thermal values (1 liter diesel is equivalent to 35.9 MJ, source: http://www.extension.iastate.edu/agdm/wholefarm/pdf/c6-87.pdf

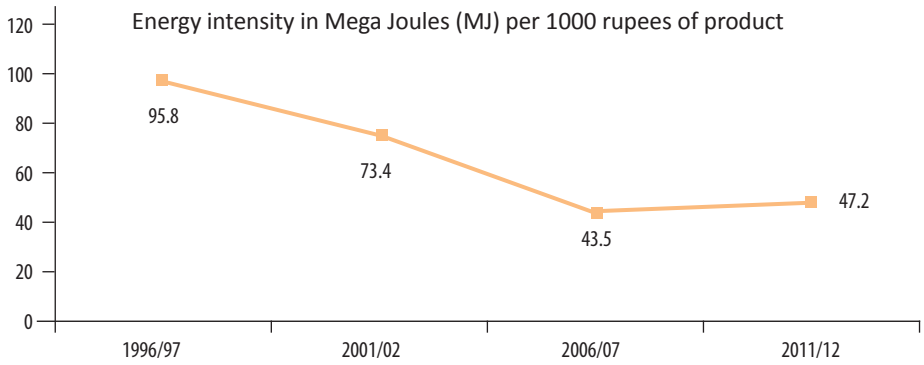
4.2.3.2 Energy Intensity (EI) in Terms of Thermal Content (1996/97-2011/12)

World Development Indicators has mentioned the energy use (kg of oil equivalent) per $1,000 GDP (constant 2005 Purchasing Power Parity) as overall energy use indicator. The indicator shows the decreasing trend of energy use in South Asia. It indicated that the value of indicator was 259.2124 kg of oil equivalent in 1996 while it was 185.1344 kg of oil equivalent in 2011.[8] Energy use in the industry sector of Nepal also shows a pattern similar to South Asia.

The quantity of energy consumption per 1000 rupees of output decreased for the whole manufacturing sector.

Table A-14 gives the energy intensity by sector for between the census years 1996/97 and 2011/12. For the whole sector, energy consumption per 1000 rupees output decreased from 95.8 MJ in 1996/97 to 47.2 MJ in 2011/12 (see also Figure 4-6).

Figure 4-6: Energy intensity in Mega Joules (MJ) per Rs 1000 of value of output

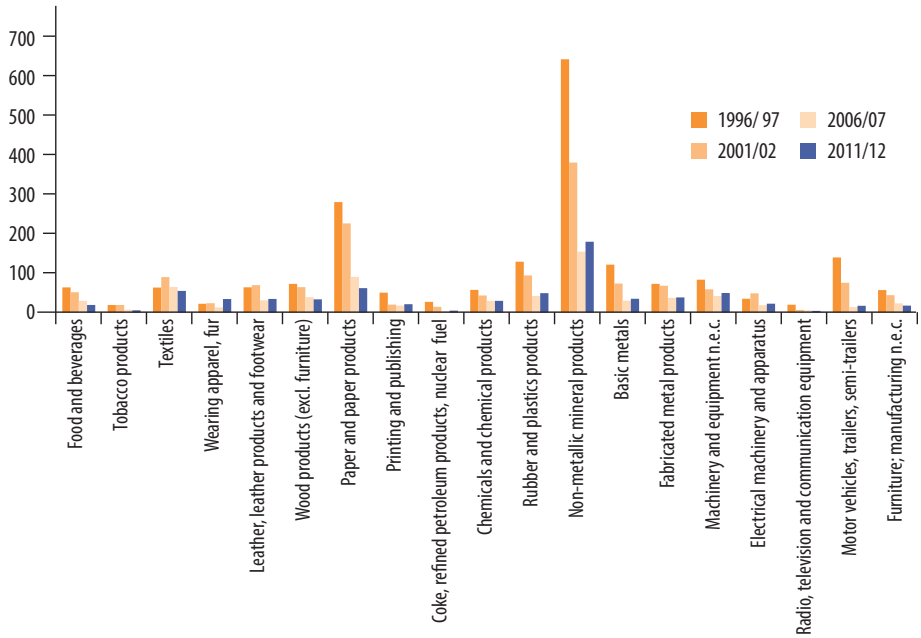


Most of the manufacturing sectors have decreasing pattern of energy consumption in Mega Joules in 20 years period except in the sector of wearing apparel & fur (see Table A-14).

8. *Source: World Development Indicators, World Bank (2013)*

In 2011/12, energy consumption was the highest for non-metallic mineral products while it was the lowest for the sector of radio, television & communication equipment (see also Figure 4-7).

Figure 4-7: Energy intensity in Mega Joules per Rs 1000 value of output by sectors

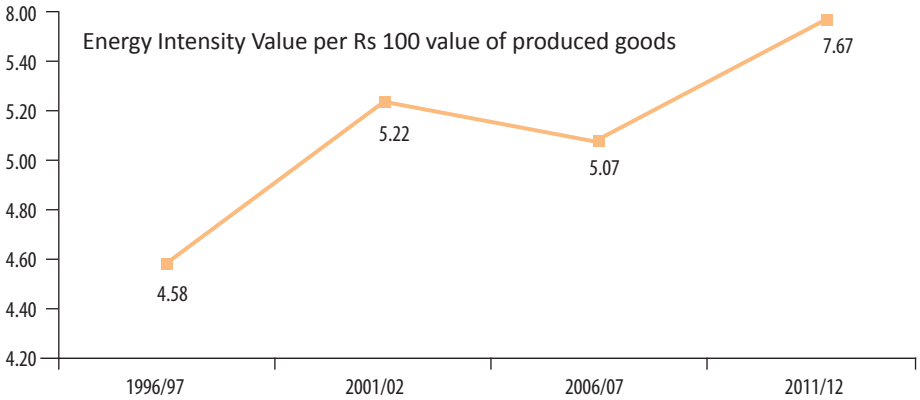


4.2.3.3 Analysis of Energy Intensity (EI) in Terms of Monetary Value

Table A-15 gives the monetary value of energy intensity by sector and census years. For the whole manufacturing sector, energy intensity has increased from Rs 4.58 of energy input to achieve the output value of Rs 100 in 1996/97 to Rs 7.67 in 2011/12. In general, the cost pattern of energy consumption has increased over the 20-year period by 3.09 points in the whole country (see Figure 4-8).

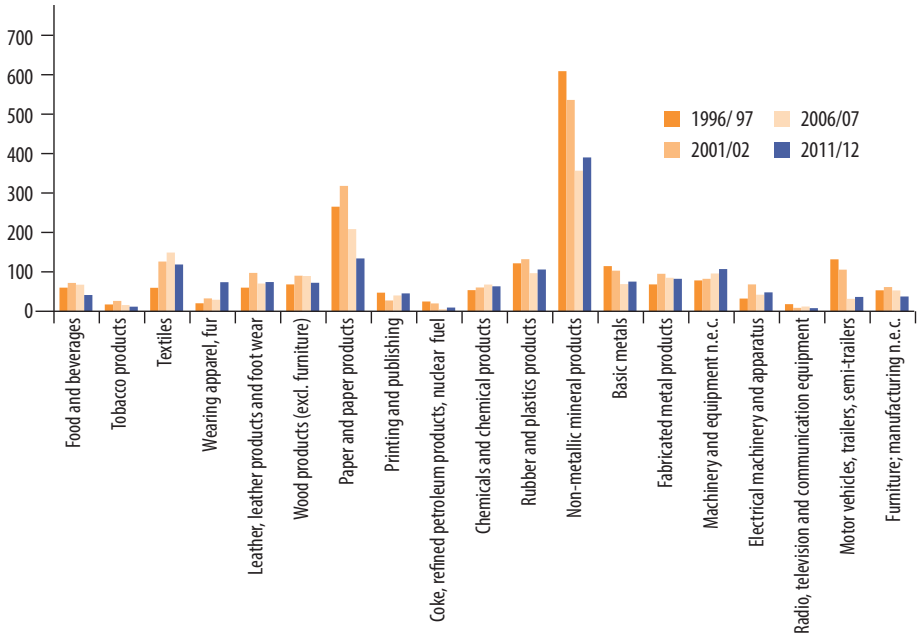
The value of energy consumption per 100 rupees of output increased from 1996 to 2001.

Figure 4-8: Energy Intensity Value per Rs 100 value of produced goods



In twenty years, wearing apparel & fur, leather, leather products & footwear, wood products, chemicals & chemical products, fabricated metal products, machinery & equipment n.e.c., and electrical machinery & apparatus have increased consumption of energy in comparison to 1996/97 while the rest of the sectors have decreased consumption of energy (Table A-15 and Figure 4-9).

Figure 4-9: Energy Intensity by manufacturing sectors



4.2.4 Utilization of Renewable Sources

The CMEs did not collect the data on fuels from renewable sources in order to assess the use of renewable energy resources in the manufacturing sector. UNIDO guidelines have suggested three different sources of renewable fuels, namely, the traditional fuel wood and charcoal (obtained from sustainable sources), synthetic liquid fuels, and fuels and heat recovered from waste products. The information on fuels from renewable sources needs to be collected in the next round of census or survey of manufacturing establishments. As there is a lack of data on it, the analysis of its utilization was not undertaken.

4.2.5 Carbon Emission from Energy Consumption

Rapid population growth has increased global demand for products, services, buildings, and public infrastructures. This has created pressure on the industries to meet these demands, hence consuming more energy and emitting more carbon dioxide (CO_2). Global intention is to meet the demands of industrial products by consuming less energy and emitting less CO_2. Most industrial energy consumption occurs in industries that produce raw materials and finished industrial products. Globally, energy consumption and direct CO_2 emission have been growing, with increases of 61% and 34 %, respectively in1971 and 2004.[9] Nearly a third of the world's energy consumption and 36% of CO_2 emissions are attributable to manufacturing industries. The major material industries like chemical, petrochemicals, iron and steel, cement, paper and pulp, and other minerals and metals account for more than two thirds of this amount.[10]

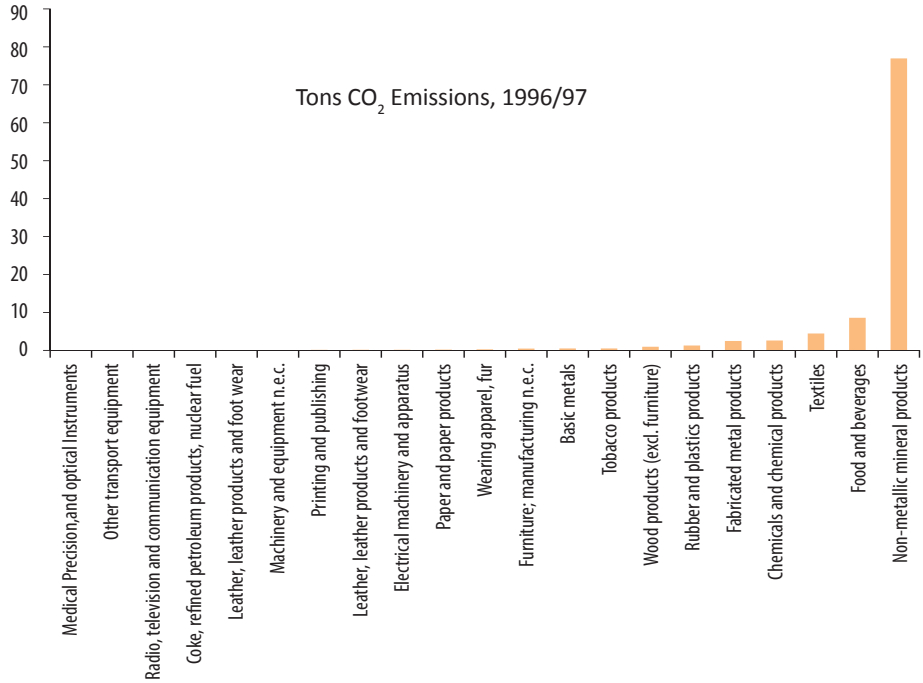
This section analyzes the carbon emission from energy consumption by manufacturing establishments that engage 10 or more persons. In the series of censuses of manufacturing establishments of Nepal, data was collected on fuel type, its quantity and amount, which allowed for the calculation of CO_2 emissions. Table A-10 shows carbon dioxide (CO_2) emissions by fuel type. This was the first attempt to estimate the carbon dioxide emissions by industries based on CMEs.

9. *Source: Reducing Industrial Energy Use and CO_2 emissions: The Role of Materials Science by D. Gielen, John Newman, Martin K. Patel (MRS Bulletin Vol. 33 April 2008, www.mrg.org/bulletin)*
10. *Source: www.iea.org/publications/freepublications/.../tracking_emissions.pdf*

Table A-17 shows the general pattern of total emissions of carbon dioxide (CO_2) by the manufacturing establishments in Nepal in 20 years.[11] The total emission of CO_2 was 517,539 tons in 1996/97. This increased by more than three folds in 2011/12.

Figure 4-10 gives the graph of CO_2 emission by industrial sectors in 1996/97. This graph shows that most of the emissions of carbon dioxide were attributable to non-metallic mineral products (76.94%), food & beverages (8.59%) followed by textiles (4.46%), chemicals & chemical products (2.61%), fabricated metal products (2.49%), and rubber & plastic products (1.29%).

Figure 4-10: Emission of CO_2 in tons, 1996/97



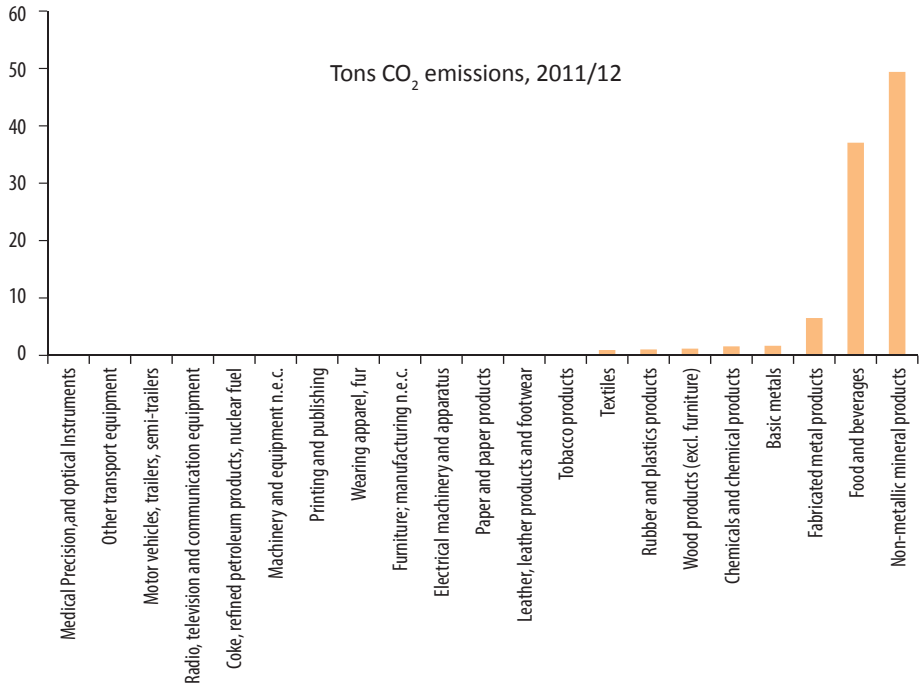
11. These figures exclude the indirect CO_2 emissions by electricity consumption.

Figure 4-11 gives the graph of CO_2 emission by industrial sectors in 2011/12. This graph also shows that in 2011/12, most of the emissions of carbon dioxide were attributable to non-metallic mineral products (49.40%). Food & beverages (37.06%) were second, followed by fabricated metal products (6.50%), basic metals (1.66%), chemicals & chemical products (1.57%), wood products (1.17%), and rubber & plastic products (1.03%), and textiles (0.92%).

In terms of CO_2 emission per thousand rupees value added, the non-metallic mineral sector stood first with 0.131 tons. A distant second was food and beverages (0.022) followed by fabricated metal products (0.013), and wood products (0.011). The non-metallic mineral sector produced 6 times more CO_2 per unit of value added than the next in line (food and beverages). It requires more information to understand the reason for this.

The Non-Metallic Mineral Sector produced 6 times more CO_2 per unit of value added than Food and Beverages.

Figure 4-11: Emission of CO_2 in tons, 2011/12



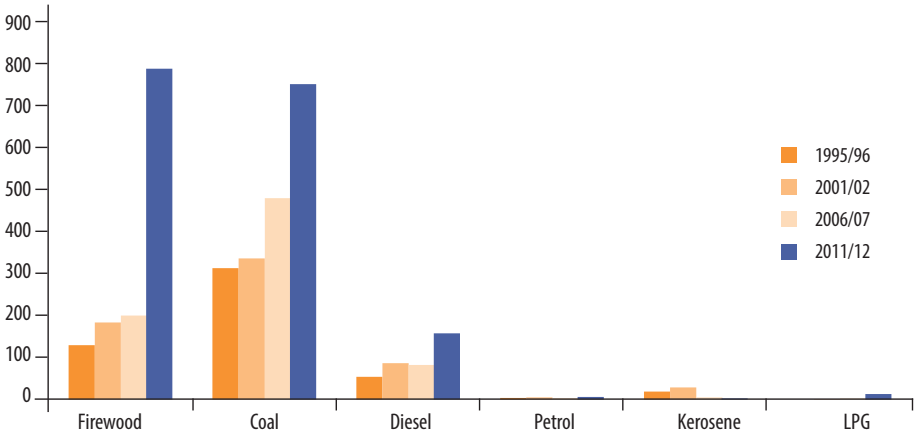
In 1996/97, carbon dioxide emitted by textile industries was significant while emission by this industry in 2011/12 was not as significant as the number of textile establishments went down that year. In this period, the emission of CO_2 made by food and beverages significantly increased. Table A-16 and Table A-17 show the carbon dioxide emission by industrial sectors in percentage and tons CO_2 respectively from 1996/97 to 2011/12.

Table 4-5 and Figure 4-12 show the carbon dioxide (CO_2) emissions by type of fuel used from 1996/97 to 2011/12. The fuel sources - firewood, coal, and diesel - were the major emitters of carbon dioxide in the industrial sector. Table 4-7 shows the change percentage of emission of CO_2 by different fuels except LPG. The emissions of CO_2 by firewood, coal, and diesel in 2011/12 significantly increased in comparison to 1996/97, while the emissions made by kerosene in 2011/12 decreased in comparison to 1996/97. Carbon dioxide emissions by fuel wood increased by 509.5 %, coal by 140.2%, diesel by 191.3%, and petrol by 64.5% in comparison to 1996/97.

Table 4-5: Carbon dioxide emission in tons by type of fuels used in industries (1996/97 to 2011/12)

Census Years	Firewood	Coal	Diesel	Petrol	Kerosene	LPG	Total
1996/97	128993	312092	53971	3702	18781	-	517539
2001/02	183138	335247	86449	4892	28792	1051	639570
2006/07	199532	478651	82186	3206	4966	2410	770951
2011/12	786247	749725	157240	6089	2505	13026	1714832

Figure 4-12: Emission of CO_2 by type of fuel (1996/97-2011/12)



Internationally, these figures are quite low, particularly when per capita CO_2 emissions are calculated (Table 4-6). International data are only available for manufacturing and construction combined. Only Cambodia scores lower since it specializes in low technology manufacturing products. (see Section 3.4.2).

The figure for "Total tons CO_2 in 2011/12" in Table 4-6 is higher than the corresponding WDI figure in Table 4-6 despite the fact that only manufacturing was included in the former, while the latter included construction as well. Since these figures are based on the recent census and include all sources of fuel, the CBS calculations are likely to be more accurate. Nevertheless, the international comparison in Table 4-6 reveals that Nepal's manufacturing industries do not have much impact on global CO_2 emissions. Per capita emissions are very low but that is also due to the small size of the sector.

A different picture emerges when looking at "Grams CO_2 emissions per 1000 US$ MVA" in the right-hand column of Table 4-6. Nepal's manufacturing and construction sector emerges second (with 1.92 grams of CO_2 emissions per 1,000 US$ MVA) after India with 2.44 grams.[12] The cleanest country is Cambodia (0.33), followed by Malaysia (0.68).

Table 4-6: Total CO_2 emissions in tons and CO_2 emissions per capita in grams per head by selected countries, 2011

Country	Total tons of CO_2 for manufacturing and construction, 2011	Population, 2011	Grams of CO_2 per capita in manufacturing and construction, 2011	Grams of CO_2 per 1000 US$ MVA, 2011
Nepal	1.15	2,715,6367*	0.042	1.92
Bangladesh	12.09	153,000,000	0.079	1.07
Cambodia	0.62	14,605,862	0.042	0.33
India	471.62	1,221,156,319	0.386	2.44
Malaysia	32.75	28,758,968	1.139	0.68
Pakistan	42.21	176,166,353	0.240	1.86
Thailand	68.57	66,576,332	1.030	1.07

Source: World Development Indicators, World Bank 2013

* The population of Nepal according to Population Census 2011 is 26,494,504 whereas the figure mentioned in the table is based on the World Bank estimation.

12. *The assumption made is that the contribution of construction to these figures is similar in all the countries listed. As such the figures in the right-hand column are not exact but indicative of the relative position.*

Table 4-7: Change per cent of CO_2 emission between 1996/97 and census years

Change between years	Change percentage				
	Firewood	Coal	Diesel	Petrol	Kerosene
Change between 2001/02 and 1996/97	42.0	7.4	60.2	32.1	53.3
Change between 2006/07 and 1996/97	54.7	53.4	52.3	-13.4	-73.6
Change between 2011/12 and 1996/97	509.5	140.2	191.3	64.5	-86.7

4.2.6 Waste Management and Disposal System in Manufacturing Sector

Waste management is generally carried out to reduce the effect of industrial production on people's health and the environment. Management issues include waste minimization, recycling and reuse, storage, collection, policy and regulations, and other environment related management concerns.

In Nepal, environment law was promulgated in 1996 which includes laws and directives regarding environment impact assessment, pollution control and prevention measures to be taken, monitoring the environment protection activities, protection of national heritage, formation of environment conservation council, compensation and penalties, etc. Entrepreneurs of industrial sectors have started to carry out environmental management activities. Hence, the CBS has collected some basic information on environmental issues of the manufacturing sector since 2006 with the view to assessing the environmental management status of the industries.

The CME 2011/12 collected information on:

- the status of installed pollution control devices or machines by type and expenditures on its installation in the census reference year,
- expenditure made by industries for environment conservation or protection in the reference year excluding the device cost in the reference year,
- status of recycle or reuse of wastes and scraps in the reference year and expenditure incurred in recycling or reuse process,
- status of achieving pollution control certificate, and
- the perception of the owners of firms towards the impact of prevailing environment laws and regulations.

4.2.6.1 Environment Pollution Control Machines Installed in the Manufacturing Establishments

The majority of the manufacturing establishments (85.4 percent) have not installed any pollution control devices.

The CME 2011/12 collected data on whether the manufacturing establishments have installed environment pollution control machines or devices in their production plants or factories. These devices could be exhaust fans, bag filters, and ventilators, precipitators, recycling of both waste water and scrap materials, incineration devices, etc. Table A-18 shows whether manufacturing establishments have installed the devices. The majority of the manufacturing establishments (85.4 per cent) have not installed any pollution control devices in their industries yet. Among the different industrial sectors, the industries associated with coke, refined petroleum products and nuclear fuel have the highest proportion of installing pollution control devices with value 33.3% followed by non-metallic mineral products (27%), basic metal (24%), and chemicals & chemical products (22.7%) while the industries in radio, television & communication equipment have not installed any pollution control devices. The proportion may be zero or low as current environment regulations or directives do not have mandatory provision for installing pollution control devices or some industries might not have required installing such devices. This may be an issue for further analysis.

4.2.7 Reuse or Recycling of the Metal or Non-metal Scraps Produced by Industry

The CME 2011/12 collected data on whether the manufacturing establishments have undertaken the process of recycling or reusing the industrial waste - metallic or non-metallic scraps like paper, plastics, rubber, leather, etc. in the reference year 2011/12. If the industry had undertaken the recycling process, the cost incurred in this environmental process would have been collected. Table A-19 shows the status of manufacturing establishments having undertaken the recycling of industrial reusable waste products. The data on industries undertaking recycling show poor performance with regards to the recycling or reuse of industrial waste or metallic and non-metallic scraps. Only about 2.8 per cent of the total number of industries had undertaken recycling in the reference year. The proportion of industries undergoing the recycling process was the highest in the rubber & plastic products with 24.5 per cent followed by leather, leather products & footwear with 12% (see Table A-19).

4.2.7.1 Management and Installation of Environment Pollution Control Devices

The CME 2011/12 collected the information regarding installation of different pollution control equipment and waste management during the census reference year excluding the existing installed environment devices. Table A-20 to Table A-25 show the status of installation and waste management practices in the industries.

- About 2 per cent (83 industries) of the total industries have installed devices to control the polluted air or bad smells emitted by the industry in the reference period.
- 6.9 per cent (283 industries) of the total industries have installed the devices to control smoke and dust particles produced by the industry in the reference period.
- 1.6 per cent (64 industries) of the total industries have installed devices to control smoke and dust particles produced by the industry in the reference period.
- 0.5 per cent (20 industries) of the total industries were involved in installing or managing the devices to control radiation emitted from the industries in the reference period.
- 7 per cent (285 industries) of the total industries were involved in installing or managing the sewerage systems or sublimating waste residuals in the pond in the reference period.
- 10.7 per cent (435 industries) of the total industries were involved in the management of solid wastes generated by the industries in the reference period.

4.2.7.2 Reuse or Recycling the Metal or Non-metal Scraps Produced by Industries

The CME 2011/12 gathered data on the practices of reuse or recycling the metallic or non -metallic scraps produced from the industry. The census result shows that very few industries, that is, only 2.8 % of the total industries are involved in recycling and reusing the scraps produced from the industries (see Table A-26). Among the 114 industries which were involved in recycling and reusing the scraps, the proportion was the highest for rubber & plastic products (24.5%), followed by leather, leather products & footwear (12%), machinery & equipment n.e.c.

Practices of reusing and recycling scraps in the industrial sectors are still low.

(7.7%), and basic metals (7.3%). The proportion for other sectors is very nominal. Hence, practices of reusing and recycling scraps in the industrial sectors are still low.

4.2.8 Pollution Control Certificate

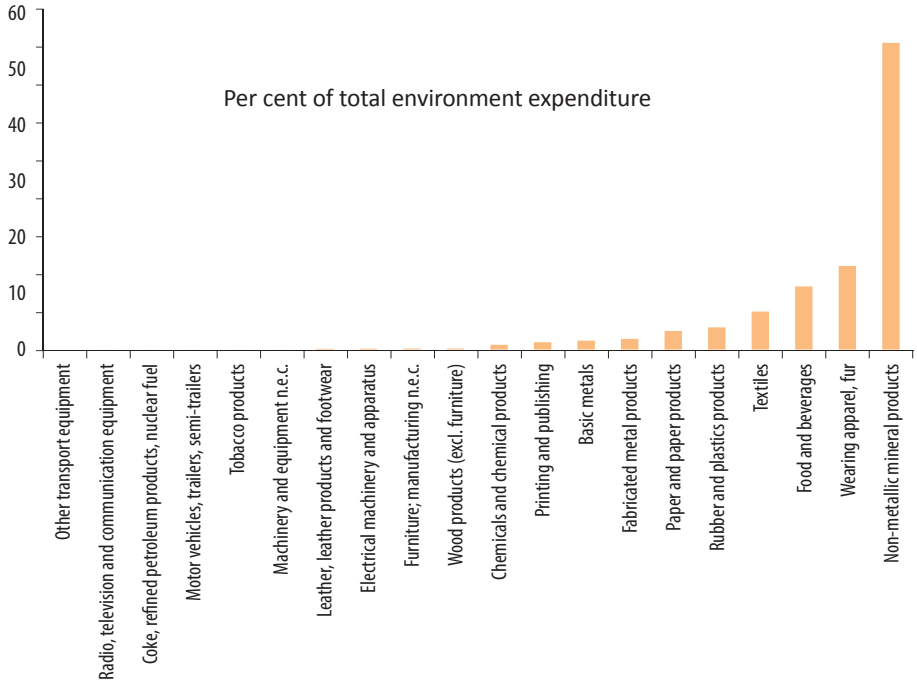
The Government of Nepal has implemented the provision of awarding pollution control certificate to the industries that control pollution as per the the environment guidelines under the environment regulation. The CME 2011/12 assessed the number of industries obtaining the pollution control certificate in the reference period. The census results reveal the fact that only about 3.9 % (159) of total industries in Nepal have acquired pollution control certificates. Among the industries which have obtained the certificate, the proportion was the highest in the industries associated with non-metallic mineral products sector (41.51%), followed by food & beverages (22.64%), (See Table A-27).

4.2.9 Expenditures on Environment Related Activities

Environmental protection expenditure is defined as the cost incurred by a manufacturing establishment while conducting specific activities aimed at protecting the environment. Expenditures on environmental related activities provide a measure of the cost to industry to comply with the current environmental regulations. The CME 2011/12 collected data on environmental expenditures on certain environmental activities. In this analysis, the environmental expenditures are the total expenditures on installing devices to control pollution of the industry, environment conservation expenditure, and the cost incurred in recycling or reusing industrial wastes or scraps.

Table A-28 reveals the total environment expenditure of industries classified by ISIC rev. 3 in the CME year 2011/12. A total of 1,534,473 thousand rupees was spent on different environmental activities like installing devices or machines for reducing industrial pollution, environment conservation and recycling or reuse process. Of the total expenditure amount, the highest proportion was spent by the non-metallic mineral products which accounts about 54 % followed by wearing apparel, fur (14.72%), food & beverages (11.11%), and textiles (6.69%). The costs of environmental expenditures incurred by other ISIC manufacturing sectors are nominal or negligible. Similarly, the CME result presents the fact that the cost of environmental expenditure is mostly spent on environment protection which accounts for 1,252,735 thousands rupees, which is 81.64 per cent of the total environmental expenditure. The environmental costs incurred on other environmental activities are either nominal or negligible (see Table A-28 and Figure 4-13).

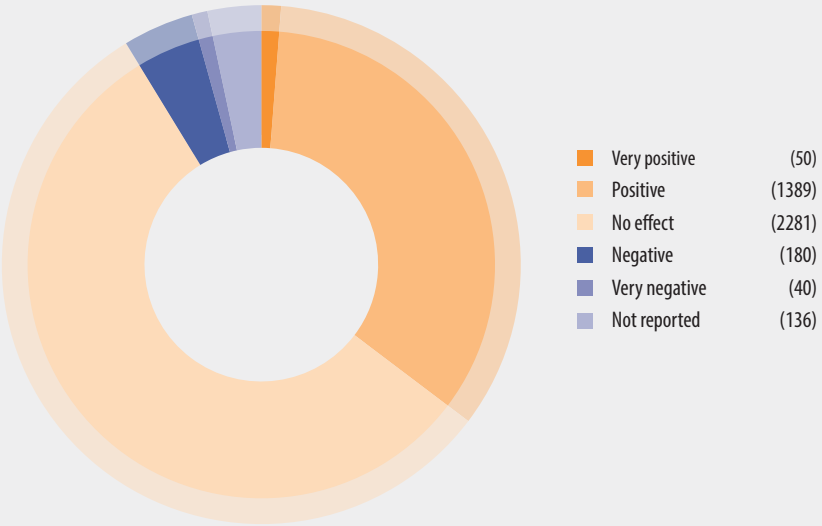
Figure 4-13: Environment expenditure by sector as percentage of total environmental expenditure, 2011/12



4.2.10 Entrepreneurial Perceptions on the Impact of Environmental Law

In the CME 2011/12, qualitative information was also collected on the perception of positive, neutral or negative impact made by prevailing environment laws and regulations on various industrial issues. The result shows that more than half (56%) of the manufacturing establishments had no impact on the industrial activities by the current prevailing environment laws. Only 34.1% of the establishments perceived positive impact on industries by the environment laws and regulations. The proportion of the industries having perceived very positive impact was only 1.2%. The proportion of the industries having perception of negative and very negative impact of the environmental laws was about 4.4% and 1.0% respectively (see Figure 4-14 and Table A-29).

Figure 4-14: Number of manufacturing establishments reporting impact of environmental laws



5 CONCLUSIONS AND RECOMMENDATIONS

The conclusions drawn and recommendations made on the basis of the information and analysis presented in the preceding chapters fall into two categories. The first category consists of conclusions and recommendations about the statistical process and the second category comprises conclusions and recommendations about the status of the manufacturing sector.

5.1 Conclusions and Recommendations about the Statistical Process

The information collected by various CMEs follows standard prescriptions of international conventions. To a large extent, the data collected provide a good general picture of the manufacturing sector over time and include many details relevant to specific users.

Yet to really know what is going on in the manufacturing sector and to provide detailed policy recommendations further information is needed on market opportunities and challenges in the past and present, investment and export potential and bottlenecks. This would be useful to entrepreneurs and policy makers alike.

Much of this information is not part of a regular census of manufacturing establishments and would require a form of information gathering that would involve entrepreneurs and other agencies such as the Ministry of Finance, Customs Department, Ministry of Industry, including some of its district offices, Ministry of Agriculture Development, Nepal Investment Board, Ministry of Science, Technology and Environment, Ministry of Women, Children and Social Welfare, and the Federation of Nepalese Chambers of Commerce and Industries (FNCCI) and the Confederation of Nepalese Industries (CNI).

One approach would be to create standing committees between the major private sector partners, the Department of Industry in the Ministry of Industry, and the Ministry of Finance and to liaise with others as needs arise. The advantage would be to streamline and coordinate the data gathering process, to obtain better access to the information collected by partners, and to update the registry of companies. The

actual work of coordination and hands on information exchange should be done at the right level of competence, preferably statisticians, but guided by those who use the information for policy formulation, business development, or other purposes.

In terms of data reliability, the analysis using data on fixed assets and other capital items showed erratic results indicating that these data are up for improvements. This is not an easy task since these data problems are well known and not only confined to Nepal's realities. In addition, it seemed that the data on value added involved in some cases high tax rates but for the purpose of productivity analysis pre-tax data are more crucial. In addition, there are some incidences of weak data resulting in illogical outcomes, for instance in the MVA/Output ratios that are larger than one. These are most likely the result of reporting errors. This is another example of the value of further data analysis.

Finally, the analysis carried out for this first monograph proved highly motivating for the staff involved in the Central Bureau of Statistics. While it may not yet be perfect, the learning experience is highly productive, beneficial for motivation, feedback into data quality, and data relevance. Further staff training in analytical capacity will prove to be a rewarding investment in human capital.

5.2 Conclusions and Recommendations for the Manufacturing Sector

5.2.1 Conclusions and Recommendations on Manufacturing Performance

The Industrial Policy 2010 aims to bring further positive changes in the area of manufacturing sector development in Nepal. Yet, the the major problems in electricity supply, skilled labour and labour relations remain to be tackled.

The manufacturing sector did not perform as the engine of growth. Nepal's manufacturing sector is the smallest in the region.

The overall picture that emerged is that:

- The manufacturing sector had its best year in 1991/92, declined in the census years 1996/97, 2001/2002, and 2006/07, and started a cautious recovery by the year 2011/12.
- The share of manufacturing in the GDP gradually declined from 9.0 per cent in 2000/01 to 6.2 per cent in 2012/13.
- Manufacturing value added per capita at constant prices only increased in 1993/94 and declined again in 1995/96. Since then it remained rather stagnant until 2010/11

with only small increases in the recent three year period between 2010/11 and 2012/13.

- Over the period from 2000/01 to 2012/13, the manufacturing sector just kept pace with the population growth and is the only sector that experienced decline (-0.2%) in terms of per capita growth.
- Apart from a declining contribution to the total GDP, the manufacturing sector also retreated towards more basic industries, e.g. food and beverages.
- Only moderate structural change occurred from 1996 to 2011, while structural change is more prominent in value added than in the number of industries.
- The MVA/Output ratio by census year showed a continuous decline in each CME year .
- The MVA per capital increased until census year 2001/02, but later on decreased particularly during the period of 2001/02 to 2006/07 and recovered during the period from 2006/07 to 2011/12.
- There was a continuous decline in total factor productivity.

Reasons behind this overall downward trend include a sectoral shift towards industries that use less capital and are more labour intensive, production stoppages due to electricity cuts, and poor labour-employer relations leading to strikes and low labour productivity, and high transport costs. The only exception is the relative success of the iron and steel sector.

Cost for both importing and exporting are very high. This is a disadvantage for exporting firms. On the other hand, high import costs provide a form of protection for domestic industries geared towards the domestic market, especially when the share of domestic value added in final output for the whole value chain is high. This is the case for agro-based industries.

From a policy perspective this means that agro-based industries and other resource based industries should be taken as one of the starting points for quality improvements, product diversification, technological development, competition with imports and export expansion. The different value chains in agro-based and resource-based industries need further detailed analysis to determine bottlenecks and opportunities for improvements even if these fall outside the manufacturing sector per se.

Exports of goods and services of Nepal stand at 10 per cent of the GDP. Again, this is the lowest of the group. Contrary to expectations for a country that has agriculture as its largest sector in the GDP, manufactured exports are a very large proportion of the total exports: 79.62 per cent. To understand the reasons why agricultural exports are so low, other information and further research is required.

The Nepal Trade Integration Strategy aims at diversification of exports. This is, of course, a necessary strategy. At the same time, export deepening in terms of higher value added by domestic production of (otherwise imported) inputs (backward linkages) or by further processing of output (forward linkages) results in more foreign exchange earnings, improved competitive position of the sector, and technological learning.

In terms of net exports, the top exporting sectors in year 2011/12 were food & beverages, textiles, rubber & plastic products, and leather, leather products & footwear. These sectors deserve further consideration in industrial policy. More information, face-to-face interaction with producers, and applied research are needed to formulate appropriate policies for further development of these sectors, to identify products (within these sectors) with potential for exports, best practice producers, and to analyze all the elements of the value chain that affect quality and competitiveness.

The basic metals and fabricated metal products sectors are strong exporters, but their net exports are considerably lower due to the large imported input requirements. Yet these are non-traditional medium-to-high technology exporters and have the promise of further product development. As such their importance in the Nepal Trade Integration Strategy seems justified.

The Global Competitive Index (GCI) of Nepal is very low – 117 out of 148. It is roughly the same as the Competitive Industrial Performance Index: 119 out of 135. Many of the problems experienced by entrepreneurs are in the field of governance. Other major obstacles to improve competitiveness are the unreliable electricity supply and poor labour-employer relations.

Policies aiming to increase foreign exchange earnings by enhancing competitiveness of the domestic productive sector must focus on competition in traded goods, e.g. exports as well as import substitutes. Since the trade balance of Nepal is highly negative (the value of imports is more than six times the value of exports), enormous potential exists in improving competition with imports. A competitive domestic industrial base, in an open trade environment, is a stepping stone for local industries to penetrate the export market. The objectives of the Industrial Policy of 2010 and the Nepal Trade Integration Strategy 2010 could easily be integrated and harmonized.

5.2.2 Conclusions and Recommendations on Manufacturing Impact

The impact of the manufacturing sector in terms of regional development as summarized in the Gini coefficient shows that the manufacturing production is highly concentrated in a few districts. The Gini coefficient in per capita value added in 2011/12 was 0.79,

indicating the high degree of inequality of per capita value added over the districts. The current level of Gini coefficient (0.79) is lower than that of the other CMEs, indicating a slightly less unequal distribution of per capita value added over the districts. In CME 2001/02 the Gini coefficient was the highest (0.86).

While this is not a positive development from the point of view of nation-wide equality, the early phases of industrialization can only benefit from industrial concentration. Emphasizing de-concentration too early will be counter-effective in the long run. In terms of space, growth comes before re-distribution. Of course, some industrial activities can and should take place near the location of input supply or demand. These form a sound basis for promoting dispersed industrial activities.

The gender impact of the manufacturing sector is captured by the enrollment ratio and the wage gap:

- In all of the four census years less than 20 per cent of all workers are women.
- With a few exceptions female wages are lower than male wages. The wage gap is almost 20 per cent.

Much progress is needed to reach gender equality. Further research and analysis is required to identify potentials for improvement.

The impact on labour skills is low: training forms only a small percentage of production costs. Larger firms spend more on labour training as percentage of total wages and salaries than smaller firms.

Findings on the environmental impact are:

- The quantity of energy consumption per unit of output decreased for the whole manufacturing sector;
- The value of energy consumption per unit of output increased from 1996 to 2001;
- Only 2.8% of total industries are involved in recycling and reusing the scraps produced from the industries;
- The majority of the manufacturing establishments (85.4 per cent) have not installed any pollution control devices.

The first two findings might indicate that entrepreneurs save on energy because of higher energy costs. The last two findings are more worrying and are in need of further analysis by specific productive and polluting activity.

5.2.3 Final Comments

This monograph has provided details of manufacturing performance and its social and regional impact in an international context. Providing this information and analysis will contribute to future policy making in support of manufacturing development.

Broadly speaking, the manufacturing sector did not keep pace with the development of the rest of the economy. Factors that create barriers to further development can be found in the sphere of governance, infrastructure, labour skills, and social relations. Compared to select countries in the region, Nepal is amongst the poorest performers.

Competition with India and China is fierce. Yet, although relatively modest, some sectors are able to export substantial amounts of their products. These include traditional sectors and some more advanced sectors. The experience gained with exporting is an asset that needs to be cherished.

Given the trade imbalances with India and to a lesser extent with China, there is an enormous potential for import substitution in a competitive environment. A sound domestic manufacturing sector able to compete on its own market is the stepping stone for export expansion.

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A. STATISTICAL APPENDIX

Table A-1: Perceptions of entrepreneurs on production problems experienced (scale 0-5)

ISIC	ISIC Description	Industrial Policy/Law	Labour Act	Environment Act	Labour realtions	Low wage	Skilled manpower	Access for credit	Market	Raw material	Electricity availability
15	Food and beverages	3	3	3	3	2	2	2	2	2	5
16	Tobacco products	2	3	2	3	2	2	2	2	2	5
17	Textiles	3	3	3	4	3	4	3	2	2	5
18	Wearing apparel, fur	3	3	3	3	3	4	3	2	2	5
19	Leather, leather products and footwear	3	3	3	3	2	3	3	2	3	5
20	Wood products (excluding furniture)	3	3	3	3	2	3	2	2	4	5
21	Paper and paper products	3	3	3	3	3	2	3	2	2	5
22	Printing and publishing	3	3	3	3	2	3	3	2	3	5
23	Coke, refined petroleum products, nuclear fuel	2.5	3	3	3	2.5	2.5	2	2	3	3.5
24	Chemicals and chemical products	2	3	2	3	2	2	2	2	3	5
25	Rubber and plastics products	3	3	3	3	2	3	2	2	2	5
26	Non-metallic mineral products	3	3	3	3	3	3	2	2	3	4
27	Basic metals	3	3	3	3	2	2	2	2	2	5
28	Fabricated metal products	3	3	3	3	2	3	3	2	2	5
29	Machinery and equipment n.e.c.	3	3	3	3	2	3	3	2	2	4
31	Electrical machinery and apparatus	2.5	3	3	3	2	3	3	2	2	5
32	Radio, television and communication equipment	2	2	2	4	2.5	2	2	2	2	4
34	Motor vehicles, trailers, semi-trailers	3	3	3	3	3	3.5	3	2.5	3	4
36	Furniture; manufacturing n.e.c.	3	3	3	3	2	4	2	2	4	5

Table A-2: Growth of gross VA per capita by industrial division in constant prices, 2000/01-2012/13

NSIC	Industrial Classification	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	Average Growth 2000/01 to 2012/13
A	Agriculture and forestry	0.8	1.1	2.4	1.2	-0.6	3.7	4.4	1.6	0.6	3.5	3.5	-0.1	1.8
B	Fishing	6.3	1.7	9.8	4.8	7.5	5.8	5.8	3.8	2.1	4.9	6.1	2.7	5.1
C	Mining and quarrying	6.4	0.9	-2.6	4.4	5.9	4.3	4.0	-0.7	0.7	1.1	3.6	4.1	2.6
D	Manufacturing	-7.4	-2.1	-0.1	0.3	-0.2	5.4	-2.2	-2.4	1.6	3.1	2.2	0.5	-0.2
E	Electricty gas and water	8.9	16.4	1.8	1.7	1.7	16.1	-0.3	-4.8	0.5	3.5	7.0	-1.1	4.1
F	Construction	4.1	-0.1	-2.5	0.6	5.3	5.3	3.6	-0.4	4.7	3.8	-1.1	0.2	1.9
G	Wholesale and retail trade	-13.5	0.0	8.4	-8.3	1.4	-3.0	2.7	3.8	5.3	0.5	1.7	8.1	0.4
H	Hotels and restaurants	-20.0	-0.2	10.3	-7.5	4.0	6.3	5.5	0.9	5.1	5.2	4.5	5.4	1.3
I	Transport, storage and communications	6.0	2.9	5.1	4.1	0.2	7.9	7.9	5.5	4.5	4.3	4.3	5.3	4.8
J	Financial intermediation	1.5	-0.6	3.9	21.5	21.6	14.4	7.7	0.6	1.4	2.4	2.1	5.2	6.6
K	Real estate, renting and business activities	-7.0	-6.1	-4.2	7.6	4.0	14.8	8.9	0.5	1.6	1.3	1.6	0.3	1.8
L	Public administration and defence	33.8	9.1	-2.8	4.3	4.5	4.1	-0.8	5.9	2.5	2.9	3.6	1.9	5.4
M	Education	18.4	11.2	2.8	7.4	1.5	10.3	5.0	9.2	5.2	2.1	3.6	2.7	6.5
N	Health and social work	5.0	12.7	3.8	8.9	3.6	9.4	7.0	8.1	3.3	4.1	8.5	5.5	6.6
O	Other community, social and personal service activities	-10.6	2.1	11.0	-5.5	1.1	22.7	7.9	11.2	10.4	6.1	5.2	3.8	5.1
	Agriculture, Forestry and Fishing	0.8	1.1	2.5	1.2	-0.5	3.7	4.4	1.6	0.6	3.6	3.6	-0.1	1.9
	Non-Agriclture	-3.2	1.2	3.0	1.0	3.0	7.2	4.4	2.9	3.9	2.7	2.8	3.6	2.7
	Total	**-1.7**	**1.2**	**2.8**	**1.1**	**1.7**	**5.9**	**4.4**	**2.4**	**2.8**	**3.0**	**3.0**	**2.3**	**2.4**

Table A-3: Principal Indicators of CME by census year (values are at constant price = 2000/01)

Principal Indicators	Census Year				
	1991/92	1996/97	2001/02	2006/07	2011/12
No. of establishments	4271	3557	3213	3446	4076
No. of employees	213653	187316	181943	169891	194989
Wages/Salaries & other benefits ('000 Rs)	5389434	4791997	6157356	6150560	7866931
Change in stocks at the end of the year ('000 Rs)	3741606	2872270	1276509	3818083	6108463
Gross addition to fixed assets ('000 Rs)	3820488	3337554	2991988	4758437	2948517
Gross fixed assets at the end of the year ('000 Rs)	32298244	31282123	38903625	60319235	57290064
Input (value) in ('000 Rs)	31139922	39029406	59944856	82431910	110019819
Output (value) ('000 Rs)	53109610	64861013	91364077	119238910	153482264
Value added in ('000 Rs)	21969689	25831608	31419222	36807000	43462446
Average no. of employee per establishment	50	53	57	49	48
Input as percentage of output	59	60	66	69	72
MVA/Employee ('000 Rs)	103	138	173	217	223
MVA/Person Engaged in ('000 Rs)	98	131	164	207	213
MVA/Output ratio	0.41	0.40	0.34	0.31	0.28
MVA per unit of capital in ('000 Rs)	0.68	0.83	0.81	0.61	0.76

Table A-4: Percentage share of some major commodities in the total exports of Nepal F.Y. 2010/11

Commodities	Unit	F.Y. 2010/11		Percentage share
		Quantity	Value	
Iron and Steel articles			10,120,304	15.68
Yarns (Polyester, cotton and others)			5,545,075	8.59
Woolen carpet	Sq.Mtr.	833,409	4,920,085	7.62
Readymade garments	Pcs.	17,084,925	4,084,040	6.33
Textiles			3,701,384	5.73
Lentils	Kg.	37,425,040	3,349,101	5.19
Jute bags and sacks			2,112,879	3.27
Cardamom	Kg.	4,821,971	2,043,716	3.17
Copper and articles thereof			1,677,159	2.60
Woolen and Pashmina shawls			1,635,629	2.53
Tea	Kg.	10,532,633	1,549,891	2.40
Dentifrices (toothpaste)			980,850	1.52
Hides & skins	Sq.ft.	16,759,063	801,648	1.24
Medicinal herbs			710,593	1.10
Noodles, pasta and like			702,567	1.09
Hats and headgears			640,270	0.99
Cotton sacks and bags			639,297	0.99
Handicrafts			521,935	0.81
Nepalese paper and paper products			456,214	0.71
Articles of silver jewellery			388,355	0.60
Ginger	Kg.	13,238,723	281,949	0.44
Vegetable fats and oil	Kg.	2,111,794	202,454	0.31
Essential oils	Kg.	31,939	82,032	0.13
Others			17,415,018	26.97
Total			**64,562,444**	**100**

Source: Trade and Export Promotion Centre, Nepal

Table A-5: Principal indicators of manufacturing by employment size and census year

Firm size by employment classes	CME Year	No. of firms	No. of employees	Gross fixed assets at the end of the year	Value added	Avg. no. of emp. per firm	MVA/ Employee	MVA/ Output Ratio	MVA per unit of capital
Total	1991/92	4271	213653	32298244	21969689	50	103	0.41	0.68
	1996/97	3557	187316	31282123	25831608	53	138	0.40	0.83
	2001/02	3213	181943	38903625	31419222	57	173	0.34	0.81
	2006/07	3446	169891	60319235	36807000	49	217	0.31	0.61
	2011/12	4076	194989	57290064	43661598	48	223	0.28	0.76
10 -19	1991/92	76	841	84540	69507	11	83	0.43	0.82
	1996/97	1752	18185	3903644	1825687	10	100	0.29	0.47
	2001/02	1635	16481	3406978	1709042	10	104	0.26	0.50
	2006/07	1912	19674	4780823	2725888	10	139	0.27	0.57
	2011/12	2355	23754	14804088	4133660	10	174	0.25	0.28
20 -49	1991/92	1173	33830	4131170	3114904	29	92	0.38	0.75
	1996/97	834	23892	3431940	2803538	29	117	0.33	0.82
	2001/02	716	19969	3942205	2886080	28	145	0.26	0.73
	2006/07	755	21793	12175047	3482546	29	160	0.31	0.29
	2011/12	793	22076	8294027	5004104	28	226	0.26	0.60
50 - 99	1991/92	594	39972	11110193	3647461	67	91	0.37	0.33
	1996/97	512	34464	3450454	3522711	67	102	0.30	1.02
	2001/02	372	25448	6083707	4095760	68	161	0.29	0.67
	2006/07	392	25706	11133895	3566946	66	139	0.32	0.32
	2011/12	406	27859	7513661	6362423	69	227	0.25	0.84

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Firm size by employment classes	CME Year	No. of firms	No. of employees	Gross fixed assets at the end of the year	Value added	Avg. no. of emp. per firm	MVA/ Employee	MVA/ Output Ratio	MVA per unit of capital
100 -199	1991/92	332	44744	2880175	3578440	135	80	0.38	1.24
	1996/97	283	37689	6853381	5763041	133	153	0.43	0.84
	2001/02	317	43379	6116172	6488826	137	150	0.30	1.06
	2006/07	229	31818	8318855	5542639	139	174	0.23	0.67
	2011/12	320	44507	8198495	7107330	139	159	0.24	0.86
>= 200	1991/92	206	74414	9123261	9681999	361	130	0.50	1.06
	1996/97	173	72733	13628114	11740421	420	161	0.48	0.86
	2001/02	172	76408	19275304	16151108	444	211	0.43	0.84
	2006/07	158	70900	23910614	16031773	449	226	0.28	0.67
	2011/12	202	76793	18479792	21054081	380	274	0.34	1.14

Table A-6: Percentage of female paid employed to total employed by type of employment, 1996/97-2011/12

NSIC	Description	Administrative				Technical				Operative			
		1996	2001	2006	2011	1996	2001	2006	2011	1996	2001	2006	2011
1	Low technology	5.0	5.9	5.4	6.0	3.3	2.5	3.7	3.9	28.8	24.9	22.8	22.1
15	Food and beverages	2.6	4.4	4.1	5.1	0.2	0.9	1.6	2.0	10.3	23.1	16.7	20.8
16	Tobacco products	8.2	7.6	8.5	5.4	16.7	2.0	-	0.8	5.1	4.2	6.6	13.9
17	Textiles	6.7	5.9	5.3	5.2	5.2	1.7	1.3	3.9	39.6	28.9	27.8	29.9
18	Wearing apparel, fur	5.4	7.8	11.2	18.0	0.4	3.0	-	22.3	19.0	28.6	45.5	34.9

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NSIC	Description	Administrative				Technical				Operative			
		1996	2001	2006	2011	1996	2001	2006	2011	1996	2001	2006	2011
19	Leather, leather products and footwear	4.4	2.8	1.5	4.4	0.0	2.9	0.9	-	15.3	14.9	8.8	20.2
20	Wood products (excl. furniture)	3.5	1.6	1.1	6.2	0.0	-	1.5	-	2.6	6.5	8.1	12.8
21	Paper and paper products	3.3	4.6	2.8	3.5	7.1	-	18.3	1.4	22.3	20.2	19.1	20.0
22	Printing and publishing	7.7	11.4	8.8	15.3	11.3	10.6	5.0	11.7	7.9	16.3	20.4	12.6
36	Furniture, manufacturing	4.2	3.4	7.5	8.1	0.9	-	-	11.8	7.6	8.0	6.4	6.2
2	Medium-low technology	4.1	4.1	4.3	3.6	4.5	1.2	0.9	1.0	14.2	18.3	16.4	20.4
23	Coke, refined petroleum products, nuclear fuel	14.3	16.7	6.9	5.7	0.0			-	3.8	11.9	5.5	6.8
25	Rubber and plastic products	3.1	3.6	11.0	8.1	2.1	1.8	0.9	1.6	10.0	11.0	15.0	13.0
26	Non-metallic mineral products	5.0	5.1	1.8	1.7	6.6	1.5	0.2	0.7	15.9	20.6	18.6	23.0
27	Basic metals	0.3	1.4	1.8	7.0	0.0	-	1.1	0.9	0.0	2.8	2.3	1.5
28	Fabricated metal products	3.7	3.1	4.4	3.2	0.0	0.8	2.4	2.0	1.5	1.0	3.7	3.1
3	Medium-high and high technology	6.1	4.8	16.5	8.8	4.9	2.4	15.1	7.7	9.2	11.1	13.6	15.7
24	Chemicals and chemical products	6.3	5.0	20.0	8.3	5.3	2.6	20.6	10.3	11.1	13.9	16.9	18.5
29	Machinery and equipment n.e.c.	0.0	-	10.1	9.9	0.0	-	-	3.8	3.0	5.2	1.0	4.0
31	Electrical machinery and apparatus	5.1	3.0	4.0	11.6	0.0	0.7	0.9	-	2.7	2.1	2.7	5.6
32	Radio, television and communication equipment	12.4	7.4	13.2	9.1	17.6	5.0	5.0	-	23.8	24.2	34.1	34.4
34	Motor vehicles, trailers, semi-trailers	0.0	5.7	-	-	0.0	-	6.7	-	0.0	1.7	-	-
	Total	**4.9**	**5.4**	**6.6**	**5.4**	**3.8**	**2.2**	**4.2**	**3.1**	**24.1**	**21.8**	**19.7**	**20.9**

Table A-7 : Mean wage ratio of female to male workers by NSIC (in%), 1996/97 – 2011/12

NSIC rev3	Description	1996/97	2001/02	2006/07	2011/12
	Low technology	**85.8**	**79.9**	**95.1**	**80.2**
15	Food and beverages	81.8	91.7	113.1	83.1
16	Tobacco products	86.9	115.4	223.7	117.2
17	Textiles	88.6	51.9	82.9	78.3
18	Wearing apparel, fur	86.2	94.5	92.5	77.0
19	Leather, leather products and footwear	70.6	81.2	80.7	75.7
20	Wood products (excl. furniture)	101.1	79.9	75.7	74.6
21	Paper and paper products	86.3	68.6	71.5	77.0
22	Printing and publishing	96.2	160.4	91.5	85.6
36	Furniture; manufacturing n.e.c.	89.8	93.9	95.4	79.9
	Medium-low technology	**85.2**	**72.7**	**74.2**	**80.3**
23	Coke, refined petroleum products, nuclear fuel	88.1	53.1	97.4	107.9
25	Rubber and plastic products	88.2	80.4	83.8	84.5
26	Non-metallic mineral products	92.7	72.6	64.9	70.8
27	Basic metals	90.0	67.4	70.1	91.9
28	Fabricated metal products	98.3	91.9	122.5	91.3

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NSIC rev3	Description	1996/97	2001/02	2006/07	2011/12
	Medium-high and high technology	**91.6**	**86.3**	**88.3**	**87.0**
24	Chemicals and chemical products	94.9	78.8	87.8	83.4
29	Machinery and equipment n.e.c.	63.7	169.8	47.2	88.3
31	Electrical machinery and apparatus	82.8	90.1	80.2	97.4
32	Radio, television and communication equipment	79.0	97.0	84.8	84.2
33	Medical, precision and optical instruments	0.0	0.0	91.4	0.0
34	Motor vehicles, trailers, semi-trailers	0.0	83.8	141.2	0.0
35	Other transport equipment	0.0	0.0	86.7	0.0
	Total	**87.1**	**79.2**	**90.4**	**81.3**

Table A-8: Median wage ratio of female to male workers by NSIC (in%), 1996/97 – 2011/12

NSIC rev3	Description	1996/97	2001/02	2006/07	2011/12
1	**Low technology**	**86.7**	**81.7**	**88.5**	**80.2**
15	Food and beverages	74.6	80.1	88.9	82.4
16	Tobacco products	55.8	92.5	142.6	118.4
17	Textiles	90.0	81.1	89.7	84.6
18	Wearing apparel, fur	87.4	70.7	88.4	83.8
19	Leather, leather products and footwear	64.7	82.7	84.6	71.9
20	Wood products (excl. furniture)	112.7	85.2	83.9	75.0
21	Paper and paper products	75.3	60.0	78.6	79.8
22	Printing and publishing	90.6	86.2	96.7	84.6
36	Furniture; manufacturing n.e.c.	93.1	93.1	82.6	73.1
2	**Medium-low technology**	**78.0**	**64.8**	**61.1**	**74.5**
23	Coke, refined petroleum products, nuclear fuel	76.5	53.1	115.4	97.8
25	Rubber and plastics products	79.8	77.3	71.0	84.0
26	Non-metallic mineral products	93.3	75.2	64.0	76.5
27	Basic metals	95.7	67.5	64.7	85.7
28	Fabricated metal products	97.2	97.3	96.5	82.7

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NSIC rev3	Description	1996/97	2001/02	2006/07	2011/12
3	**Medium-high and high technology**	**83.1**	**84.3**	**79.2**	**84.2**
24	Chemicals and chemical products	80.8	68.9	74.8	83.7
29	Machinery and equipment n.e.c.	66.2	185.1	50.5	84.7
31	Electrical machinery and apparatus	92.2	89.6	89.5	88.4
32	Radio, television and communication equipment	86.7	100.9	102.2	74.2
33	Medical, precision and optical instruments	0.0	0.0	91.4	0.0
34	Motor vehicles, trailers, semi-trailers	0.0	84.8	158.6	0.0
35	Other transport equipment	0.0	0.0	119.1	0.0
	Total	**87.5**	**81.9**	**85.7**	**82.9**

Table A-9: Distribution of per capita value added and percentage of value added by districts

S.N.	District Name	Per capita value added (Rs)				Percentage distribution of value added			
		1996/97	2001/02	2006/07	20011/12	1996/97	2001/02	2006/07	20011/12
1	Taplejung	0.0	14.2	27.9	74.5	0.0	0.0	0.0	0.0
2	Panchthar	30.6	19.0	37.0	96.1	0.0	0.0	0.0	0.0
3	Ilam	98.6	149.1	130.2	478.1	0.1	0.2	0.1	0.2
4	Jhapa	268.8	437.3	819.5	1448.0	0.9	1.6	1.5	1.5
5	Morang	2214.4	2270.7	3670.7	7672.9	8.6	10.0	8.4	9.2
6	Sunsari	1255.1	3023.7	3028.2	3967.0	3.4	9.9	5.2	3.7
7	Dhankuta	0.0	-11.5	112.6	185.8	0.0	0.0	0.0	0.0
8	Terhathum	17.5	16.9	66.8	170.9	0.0	0.0	0.0	0.0
9	Sankhuwasabha	0.0	0.0	23.6	243.7	0.0	0.0	0.0	0.0
10	Bhojpur	9.2	0.0	0.0	5.5	0.0	0.0	0.0	0.0
11	Solukhumbu	55.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	Okhaldhunga	0.0	0.0	24.0	0.0	0.0	0.0	0.0	0.0
13	Khotang	0.0	0.0	16.4	8.3	0.0	0.0	0.0	0.0
14	Udayapur	804.0	1439.0	1631.8	509.8	1.0	2.2	1.3	0.2
15	Saptari	60.3	30.2	226.4	1295.2	0.2	0.1	0.3	1.0
16	Siraha	171.5	36.8	147.7	501.5	0.5	0.1	0.2	0.4
17	Dhanusa	899.9	453.9	4481.9	808.8	2.8	1.6	8.2	0.8
18	Mahottari	204.2	200.8	357.9	723.7	0.5	0.6	0.5	0.6
19	Sarlahi	391.2	310.5	269.6	738.8	1.1	1.0	0.5	0.7

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S.N.	District Name	Per capita value added (Rs)				Percentage distribution of value added			
		1996/97	2001/02	2006/07	20011/12	1996/97	2001/02	2006/07	20011/12
20	Sindhuli	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	Ramechhap	0.0	0.0	35.4	33.8	0.0	0.0	0.0	0.0
22	Dolakha	61.6	9.4	36.4	89.5	0.1	0.0	0.0	0.0
23	Sindhupalchok	144.6	6.3	60.9	876.9	0.2	0.0	0.0	0.3
24	Kavre	83.6	203.8	520.1	1026.5	0.2	0.4	0.5	0.5
25	Lalitpur	6856.1	2139.2	2204.2	2002.6	10.1	3.8	2.0	1.2
26	Bhaktapur	1756.8	841.6	1904.2	7456.7	1.7	1.0	1.2	2.8
27	Kathmandu	6495.9	2097.6	3070.1	3970.6	26.5	11.8	9.6	8.6
28	Nuwakot	29.0	6.6	12.9	209.5	0.0	0.0	0.0	0.1
29	Rasuwa	95.8	-128.5	82.6	0.0	0.0	0.0	0.0	0.0
30	Dhading	51.1	73.6	130.9	512.1	0.1	0.1	0.1	0.2
31	Makwanpur	3322.2	3500.3	5671.5	7033.2	6.0	7.2	6.1	3.7
32	Rautahat	342.4	323.5	159.8	1009.0	0.8	0.9	0.2	0.9
33	Bara	7012.0	9207.3	16515.7	36192.6	16.8	26.9	25.6	30.8
34	Parsa	1732.0	1329.9	5371.6	5437.1	3.7	3.5	7.4	4.0
35	Chitawan	1980.0	1469.8	989.6	4404.1	4.1	3.6	1.3	3.2
36	Gorkha	865.9	365.9	312.2	364.7	1.2	0.6	0.2	0.1
37	Lamjung	0.0	10.8	21.1	185.9	0.0	0.0	0.0	0.0
38	Tanahu	125.5	18.2	141.7	728.3	0.2	0.0	0.1	0.3
39	Syangja	12.4	6.0	23.9	280.3	0.0	0.0	0.0	0.1
40	Kaski	679.3	443.2	1157.6	2482.9	1.2	0.9	1.2	1.5

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S.N.	District Name	Per capita value added (Rs)				Percentage distribution of value added			
		1996/97	2001/02	2006/07	20011/12	1996/97	2001/02	2006/07	20011/12
41	Manang	0.0	0.0	0.0	1014.8	0.0	0.0	0.0	0.0
42	Mustang	125.8	0.0	255.0	0.0	0.0	0.0	0.0	0.0
43	Myagdi	36.4	33.5	65.5	239.6	0.0	0.0	0.0	0.0
44	Parbat	37.6	12.1	47.9	275.2	0.0	0.0	0.0	0.0
45	Baglung	15.6	0.0	13.9	112.9	0.0	0.0	0.0	0.0
46	Gulmi	13.5	0.0	25.4	26.3	0.0	0.0	0.0	0.0
47	Palpa	68.8	-228.4	97.8	199.3	0.1	-0.3	0.1	0.1
48	Nawalparasi	1246.1	2264.4	6237.9	8695.1	3.2	6.7	9.6	6.9
49	Rupandehi	603.6	660.1	2173.1	8928.5	1.8	2.4	4.3	9.7
50	Kapilbastu	73.7	413.6	989.9	2688.5	0.2	1.0	1.3	1.9
51	Arghakhanchi	0.0	0.0	17.9	200.2	0.0	0.0	0.0	0.0
52	Pyuthan	0.0	0.0	17.4	24.1	0.0	0.0	0.0	0.0
53	Rolpa	10.1	0.0	0.0	8.4	0.0	0.0	0.0	0.0
54	Rukum	0.0	0.0	0.0	5.3	0.0	0.0	0.0	0.0
55	Salyan	0.0	9.0	0.0	0.0	0.0	0.0	0.0	0.0
56	Dang	78.0	29.0	165.1	903.6	0.2	0.1	0.2	0.6
57	Banke	924.8	839.5	1392.9	3943.5	1.6	1.7	1.5	2.4
58	Bardiya	93.2	10.0	47.4	439.6	0.2	0.0	0.0	0.2
59	Surkhet	7.6	26.6	38.0	161.7	0.0	0.0	0.0	0.1
60	Dailekh	0.0	0.0	0.0	5.4	0.0	0.0	0.0	0.0
61	Jajarkot	15.7	0.0	0.0	3.6	0.0	0.0	0.0	0.0

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S.N.	District Name	Per capita value added (Rs)				Percentage distribution of value added			
		1996/97	2001/02	2006/07	20011/12	1996/97	2001/02	2006/07	20011/12
62	Dolpa	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63	Jumla	0.0	0.0	41.6	14.7	0.0	0.0	0.0	0.0
64	Kalikot	0.0	0.0	0.0	8.6	0.0	0.0	0.0	0.0
65	Mugu	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
66	Humla	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
67	Bajura	0.0	17.6	34.2	25.1	0.0	0.0	0.0	0.0
68	Bajhang	0.0	0.0	0.0	4.3	0.0	0.0	0.0	0.0
69	Achham	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70	Doti	0.0	0.0	17.8	49.8	0.0	0.0	0.0	0.0
71	Kailali	186.3	99.5	275.5	773.8	0.5	0.3	0.5	0.7
72	Kanchanpur	110.7	55.8	168.8	890.5	0.2	0.1	0.2	0.5
73	Dadeldhura	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
74	Baitadi	0.0	0.0	0.0	7.7	0.0	0.0	0.0	0.0
75	Darchula	0.0	0.0	0.0	5.5	0.0	0.0	0.0	0.0
	Nepal	**948.4**	**827.8**	**1584.0**	**3027.1**	**100.0**	**100.0**	**100.0**	**100.0**

Table A-10: Percentage distribution of per capita employment by districts

S.N.	District Name	Per capita percentage employed			
		1996/97	2001/02	2006/07	20011/12
1	Taplejung	0.02	0.04	0.04	0.05
2	Panchthar	0.02	0.14	0.15	0.14
3	Ilam	0.12	0.35	0.17	0.21
4	Jhapa	0.49	1.47	1.23	0.73
5	Morang	1.81	2.58	2.26	1.92
6	Sunsari	1.37	2.98	2.48	1.87
7	Dhankuta	0.11	0.15	0.21	0.40
8	Terhathum	0.09	0.19	0.18	0.26
9	Sankhuwasabha	0.04	0.02	0.06	0.09
10	Bhojpur	0.05	0.01	0.03	0.03
11	Solukhumbu	0.21	0.03	0.02	0.00
12	Okhaldhunga	0.04	0.00	0.02	0.00
13	Khotang	0.03	0.03	0.02	0.02
14	Udayapur	0.37	0.31	0.33	0.25
15	Saptari	0.40	0.52	0.47	1.35
16	Siraha	0.49	0.14	0.25	0.08
17	Dhanusa	0.68	0.49	0.58	0.18
18	Mahottari	0.31	0.51	0.24	0.76
19	Sarlahi	0.43	0.37	0.30	0.66
20	Sindhuli	0.02	0.00	0.00	0.00
21	Ramechhap	0.03	0.00	0.05	0.05
22	Dolakha	0.18	0.16	0.05	0.15
23	Sindhupalchok	0.20	0.05	0.06	0.12
24	Kavre	0.43	0.29	0.31	0.27
25	Lalitpur	9.39	5.60	2.30	0.87
26	Bhaktapur	3.52	3.71	2.65	6.82
27	Kathmandu	7.92	3.39	1.83	0.82
28	Nuwakot	0.09	0.04	0.07	0.12
29	Rasuwa	0.33	0.48	0.05	0.00
30	Dhading	0.04	0.05	0.08	0.14
31	Makwanpur	1.48	0.85	0.82	0.82

Contd..

S.N.	District Name	Per capita percentage employed			
		1996/97	2001/02	2006/07	20011/12
32	Rautahat	0.49	0.24	0.48	0.50
33	Bara	1.50	1.64	2.48	2.83
34	Parsa	1.84	1.28	1.50	1.37
35	Chitawan	0.95	0.88	0.85	1.08
36	Gorkha	0.29	0.19	0.23	0.20
37	Lamjung	0.03	0.03	0.04	0.24
38	Tanahu	0.19	0.48	0.40	0.32
39	Syangja	0.06	0.04	0.06	0.20
40	Kaski	0.74	0.80	0.84	0.96
41	Manang	0.00	0.00	0.00	0.00
42	Mustang	0.20	0.00	0.36	0.39
43	Myagdi	0.11	0.10	0.06	0.10
44	Parbat	0.07	0.05	0.06	0.21
45	Baglung	0.05	0.02	0.03	0.04
46	Gulmi	0.04	0.02	0.03	0.04
47	Palpa	0.27	0.21	0.14	0.19
48	Nawalparasi	0.70	1.01	0.93	1.78
49	Rupandehi	1.15	1.00	0.99	1.73
50	Kapilbastu	0.41	0.99	0.79	0.91
51	Arghakhanchi	0.02	0.03	0.03	0.15
52	Pyuthan	0.01	0.01	0.01	0.01
53	Rolpa	0.00	0.00	0.00	0.01
54	Rukum	0.04	0.01	0.01	0.01
55	Salyan	0.01	0.07	0.00	0.00
56	Dang	0.11	0.19	0.21	0.43
57	Banke	0.88	1.07	0.84	1.62
58	Bardiya	0.35	0.21	0.07	0.39
59	Surkhet	0.11	0.06	0.09	0.14
60	Dailekh	0.02	0.02	0.01	0.01
61	Jajarkot	0.06	0.02	0.02	0.01
62	Dolpa	0.00	0.00	0.04	0.00
63	Jumla	0.00	0.01	0.04	0.01

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S.N.	District Name	Per capita percentage employed			
		1996/97	2001/02	2006/07	20011/12
64	Kalikot	0.00	0.00	0.02	0.01
65	Mugu	0.00	0.00	0.02	0.00
66	Humla	0.00	0.00	0.00	0.00
67	Bajura	0.01	0.03	0.04	0.04
68	Bajhang	0.00	0.01	0.01	0.01
69	Achham	0.02	0.01	0.01	0.00
70	Doti	0.01	0.01	0.02	0.03
71	Kailali	0.56	0.64	0.63	0.43
72	Kanchanpur	0.56	0.45	0.51	0.71
73	Dadeldhura	0.00	0.00	0.00	0.00
74	Baitadi	0.00	0.00	0.00	0.01
75	Darchula	0.02	0.00	0.00	0.01
	Nepal	**0.93**	**0.83**	**0.69**	**0.77**

Table A-11: Per capita manufacturing value added in US $ of SAARC countries by years

Country	1996	2001	2006
Nepal	18.4	20.9	23.8
Afghanistan	10.6	30.8	44.1
Bangladesh	50.2	53.7	72.1
Bhutan	68.2	67.8	101.3
India	63.2	62.3	121.3
Pakistan	70.8	70.8	142.0
Sri Lanka	111.2	117.5	270.9
Maldives	127.6	169.7	242.5

Source: Trade and Export Promotion Centre, Nepal

Table A-12: CO_2 emissions per unit by fuel type

SN	Fuel type	per Unit	kg CO_2 emission per unit	Source
1	Firewood/ fuelwood	kg	1.833	http://www.sciencedirect.com/science?_ob...
				Yahoo answers: *How much Carbon Dioxide will emit from 1 tonne of tamarind firewood, if we burn it?*
2	Coal	kg	2.567	http://www.engineeringtoolbox.com/co2-emission-fuels-d_1085.html
3	Diesel	litre	2.6400	http://www.ecoscore.be/en/how-calculate-co2-emission-level-fuel-consumption
4	Petrol	litre	2.392	http://www.ecoscore.be/en/how-calculate-co2-emission-level-fuel-consumption
5	Kerosene	litre	2.64	http://www.engineeringtoolbox.com/co2-emission-fuels-d_1085.html
6	LPG	kg	3.027	http://www.ecoscore.be/en/how-calculate-co2-emission-level-fuel-consumption

Table A-13: Material intensity by sector (in %), 1996/97-2011/12

Sector	Description	1996	2002	2007	2012
15	Food and beverages	62.35	65.60	71.39	71.55
16	Tobacco products	27.56	17.68	17.01	23.8
17	Textiles	50.71	54.97	66.33	67.92
18	Wearing apparel, fur	62.24	55.54	60.16	65.98
19	Leather, leather products and footwear	61.51	63.03	71.44	69.31
20	Wood products (excl. furniture)	56.04	66.35	66.23	64.83

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Sector	Description	1996	2002	2007	2012
21	Paper and paper products	51.02	56.38	40.01	62.87
22	Printing and publishing	46.81	52.65	53.90	56.98
23	Coke, refined petroleum products, nuclear fuel	74.36	75.42	39.02	67.5
24	Chemicals and chemical products	61.88	58.14	52.16	52.75
25	Rubber and plastics products	59.02	64.36	72.26	69.09
26	Non-metallic mineral products	14.43	23.56	49.96	48.17
27	Basic metals	74.66	79.57	74.78	80.04
28	Fabricated metal products	67.13	76.55	78.16	76.81
29	Machinery and equipment n.e.c.	58.35	55.91	68.85	66.81
31	Electrical machinery and apparatus	70.31	75.53	82.18	71.48
32	Radio, television and communication equipment	55.49	74.35	66.37	64.97
34	Motor vehicles, trailers, semi-trailers	64.43	59.07	67.31	64.12
36	Furniture; manufacturing n.e.c.	53.38	58.02	54.90	58.92
	Nepal	**55.12**	**60.02**	**64.32**	**66.05**

Table A-14: Energy consumed in Mega Joules (MJ) per Rs 1000 value of produced goods, 1996/97-2011/12

ISIC rev.3	Description	1996/97	2001/02	2006/07	2011/12
15	Food and beverages	63.4	51.1	29.3	19.1
16	Tobacco products	18.9	19.1	7.1	5.6
17	Textiles	63.0	89.3	64.4	54.5
18	Wearing apparel, fur	22.0	23.4	12.9	34.1
19	Leather, leather products and footwear	63.7	69.1	30.6	34.3
20	Wood products (excl. furniture)	72.2	64.1	38.7	33.3
21	Paper and paper products	278.6	224.8	90.0	61.5
22	Printing and publishing	50.0	19.8	17.6	21.0
23	Coke, refined petroleum products, nuclear fuel	26.8	14.4	2.5	4.6
24	Chemicals and chemical products	57.0	43.0	29.5	29.3
25	Rubber and plastic products	128.2	93.6	41.8	48.8
26	Non-metallic mineral products	639.2	378.4	153.7	178.7
27	Basic metals	120.7	73.1	30.0	34.7
28	Fabricated metal products	72.3	67.5	36.9	38.0
29	Machinery and equipment n.e.c.	82.7	58.5	41.6	49.2
31	Electrical machinery and apparatus	34.7	48.4	18.4	22.2
32	Radio, television and communication equipment	19.7	6.7	5.4	4.0
34	Motor vehicles, trailers, semi-trailers	138.8	75.0	13.8	16.9
36	Furniture; manufacturing n.e.c.	56.5	43.8	23.1	17.4
	Nepal	**95.8**	**73.4**	**43.5**	**47.2**

Table A-15: Energy Intensity per 100 Rs value of produced goods (1996/97-2011/12)

ISIC rev.3 code in 2 digit	Description	1996/97	2001/02	2006/07	2011/12
15	Food and beverages	3.03	3.63	3.42	2.09
16	Tobacco products	0.90	1.35	0.82	0.61
17	Textiles	3.01	6.34	7.5	5.97
18	Wearing apparel, fur	1.05	1.66	1.5	3.73
19	Leather, leather products and footwear	3.04	4.91	3.57	3.75
20	Wood products (excl. furniture)	3.45	4.55	4.51	3.64
21	Paper and paper products	13.31	15.97	10.48	6.74
22	Printing and publishing	2.39	1.41	2.05	2.31
23	Coke, refined petroleum products, nuclear fuel	1.28	1.02	0.3	0.51
24	Chemicals and chemical products	2.72	3.05	3.43	3.21
25	Rubber and plastic products	6.13	6.65	4.86	5.34
26	Non-metallic mineral products	30.54	26.88	17.9	19.57
27	Basic metals	5.77	5.2	3.49	3.80
28	Fabricated metal products	3.45	4.8	4.3	4.17
29	Machinery and equipment n.e.c.	3.95	4.16	4.84	5.39
31	Electrical machinery and apparatus	1.66	3.44	2.14	2.43
32	Radio, television and communication equipment	0.94	0.47	0.63	0.44
34	Motor vehicles, trailers, semi-trailers	6.63	5.33	1.61	1.85
36	Furniture; manufacturing n.e.c.	2.70	3.11	2.69	1.90
	Nepal	**4.58**	**5.22**	**5.07**	**7.67**

Table A-16: Carbon dioxide emission by industrial sectors in percentage (1996/97 – 2011/12)

NSIC code3	NSIC Name	1996/97	2001/02	2006/07	2011/12
15	Food and beverages	8.59	11.51	9.96	37.06
16	Tobacco products	0.52	0.58	0.25	0.18
17	Textiles	4.46	3.06	1.67	0.92
18	Wearing apparel, fur	0.28	0.53	0.11	0.04
19	Leather, leather products and footwear	0.17	0.30	0.05	0.11
20	Wood products (excl. furniture)	0.97	0.73	0.20	1.17
21	Paper and paper products	0.20	1.02	0.48	0.11
22	Printing and publishing	0.15	0.08	0.06	0.04
23	Coke, refined petroleum products, nuclear fuel	0.03	0.01	0.01	0.01
24	Chemicals and chemical products	2.61	4.36	2.86	1.57
25	Rubber and plastic products	1.29	0.80	0.76	1.03
26	Non-metallic mineral products	76.94	71.30	72.32	49.40
27	Basic metals	0.52	2.96	2.57	1.66
28	Fabricated metal products	2.49	2.22	8.28	6.50
29	Machinery and equipment n.e.c.	0.08	0.08	0.15	0.03
31	Electrical machinery and apparatus	0.18	0.22	0.16	0.09
32	Radio, television and communication equipment	0.01	0.00	0.01	0.01
33	Medical Precision, and optical Instruments			0.001	
34	Motor vehicles, trailers, semi-trailers	0.03	0.00	0.00	0.00
35	Other transport equipment			0.002	
36	Furniture; manufacturing n.e.c.	0.48	0.22	0.10	0.07
	Nepal	**100.00**	**100.00**	**100.00**	**100.00**

Table A-17: Carbon dioxide emission by industrial sectors in tons (1996/97-2011/12)

NSIC code 3	NSIC Name	1996/97	2001/02	2006/07	2011/12
15	Food and beverages	44,477	73,601	76,761	635,478
16	Tobacco products	2,706	3,696	1,920	3,158
17	Textiles	23,062	19,560	12,887	15,803
18	Wearing apparel, fur	1,443	3,383	869	711
19	Leather, leather products and footwear	870	1,896	392	1,963
20	Wood products (excl. furniture)	5,026	4,696	1,545	20,123
21	Paper and paper products	1,060	6,519	3,677	1,897
22	Printing and publishing	781	528	463	610
23	Coke, refined petroleum products, nuclear fuel	143	85	102	144
24	Chemicals and chemical products	13,516	27,896	22,032	26,896
25	Rubber and plastic products	6,661	5,148	5,838	17,603
26	Non-metallic mineral products	398,216	456,036	557,544	847,090
27	Basic metals	2,670	18,954	19,849	28,497
28	Fabricated metal products	12,894	14,180	63,804	111,406
29	Machinery and equipment n.e.c.	391	539	1,157	470
31	Electrical machinery and apparatus	933	1,403	1,209	1,586
32	Radio, television and communication equipment	48	28	64	109
33	Medical Precision, and optical Instruments			7	
34	Motor vehicles, trailers, semi-trailers	170	27	20	84
35	Other transport equipment			19	
36	Furniture; manufacturing n.e.c.	2,471	1,395	792	1,203
	Nepal	**517,539**	**639,570**	**770,951**	**1,714,832**

Table A-18: Status of manufacturing establishments having pollution control machine installed

ISIC rev 3 Codes	Description	Having any pollution control machine			Percent having pollution control machine/tools installed
		Yes	No	Total	
15	Food and beverages	166	899	1065	15.6
16	Tobacco products	3	27	30	10.0
17	Textiles	20	268	288	6.9
18	Wearing apparel, fur	6	65	71	8.5
19	Leather, leather products and footwear	9	41	50	18.0
20	Wood products (excl. furniture)	14	305	319	4.4
21	Paper and paper products	11	81	92	12.0
22	Printing and publishing	5	89	94	5.3
23	Coke, refined petroleum products, nuclear fuel	2	4	6	33.3
24	Chemicals and chemical products	30	102	132	22.7
25	Rubber and plastics products	31	206	237	13.1
26	Non-metallic mineral products	253	681	934	27.1
27	Basic metals	10	31	41	24.4
28	Fabricated metal products	16	217	233	6.9
29	Machinery and equipment n.e.c.	1	25	26	3.8
31	Electrical machinery and apparatus	6	27	33	18.2
32	Radio, television and communication equipment	0	5	5	0.0
34	Motor vehicles, trailers, semi-trailers	1	13	14	7.1
36	Furniture; manufacturing n.e.c.	11	395	406	2.7
	Nepal	**595**	**3481**	**4076**	**14.6**

Table A-19: Status of reuse or recycle the metal or non-metal scraps produced by Industry by ISIC rev.3 in 2 digit

ISIC Rev.3 code	Description	Reuse or recycle the metal or non-metal scraps			% of Reuse or recycle
		Yes	No	Total	
15	Food and beverages	9	1056	1065	0.8
16	Tobacco products	0	30	30	0.0
17	Textiles	3	285	288	1.0
18	Wearing apparel, fur	2	69	71	2.8
19	Leather, leather products and footwear	6	44	50	12.0
20	Wood products (excl. furniture)	1	318	319	0.3
21	Paper and paper products	5	87	92	5.4
22	Printing and publishing	2	92	94	2.1
23	Coke, refined petroleum products, nuclear fuel	0	6	6	0.0
24	Chemicals and chemical products	1	131	132	0.8
25	Rubber and plastic products	58	179	237	24.5
26	Non-metallic mineral products	6	928	934	0.6
27	Basic metals	3	38	41	7.3
28	Fabricated metal products	7	226	233	3.0
29	Machinery and equipment n.e.c.	2	24	26	7.7
31	Electrical machinery and apparatus	1	32	33	3.0
32	Radio, television and communication equipment	0	5	5	0.0
34	Motor vehicles, trailers, semi-trailers	0	14	14	0.0
36	Furniture; manufacturing n.e.c.	8	398	406	2.0
	Nepal (Total)	**114**	**3962**	**4076**	**2.8**
	Nepal (%)	**2.8**	**97.2**	**100.0**	

Table A-20: Status of polluted air, gas control machine installation

ISIC rev3 code	Description	Installation Status			Percent
		Yes	No	Total	
15	Food and beverages	23	1042	1065	2.2
16	Tobacco products	1	29	30	3.3
17	Textiles	3	285	288	1.0
18	Wearing apparel, fur	3	68	71	4.2
19	Leather, leather products and footwear	0	50	50	0.0
20	Wood products (excl. furniture)	1	318	319	0.3
21	Paper and paper products	0	92	92	0.0
22	Printing and publishing	0	94	94	0.0
23	Coke, refined petroleum products, nuclear fuel	1	5	6	16.7
24	Chemicals and chemical products	11	121	132	8.3
25	Rubber and plastics products	11	226	237	4.6
26	Non-metallic mineral products	13	921	934	1.4
27	Basic metals	5	36	41	12.2
28	Fabricated metal products	1	232	233	0.4
29	Machinery and equipment n.e.c.	1	25	26	3.8
31	Electrical machinery and apparatus	5	28	33	15.2
32	Radio, television and communication equipment	0	5	5	0.0
34	Motor vehicles, trailers, semi-trailers	0	14	14	0.0
36	Furniture; manufacturing n.e.c.	4	402	406	1.0
	Nepal (Total)	**83**	**3993**	**4076**	**2.0**
	Nepal (%)	**2.0**	**98.0**		

Table A-21: Status of smoke and dust control machine installation

ISIC rev3 code	Description	Installation Status			Percent
		Yes	No	Total	
15	Food and beverages	97	968	1065	9.1
16	Tobacco products	1	29	30	3.3
17	Textiles	11	277	288	3.8
18	Wearing apparel, fur	2	69	71	2.8
19	Leather, leather products and footwear	0	50	50	0.0
20	Wood products (excl. furniture)	6	313	319	1.9
21	Paper and paper products	5	87	92	5.4
22	Printing and publishing	1	93	94	1.1
23	Coke, refined petroleum products, nuclear fuel	2	4	6	33.3
24	Chemicals and chemical products	17	115	132	12.9
25	Rubber and plastic products	16	221	237	6.8
26	Non-metallic mineral products	105	829	934	11.2
27	Basic metals	5	36	41	12.2
28	Fabricated metal products	6	227	233	2.6
29	Machinery and equipment n.e.c.	1	25	26	3.8
31	Electrical machinery and apparatus	4	29	33	12.1
32	Radio, television and communication equipment	1	4	5	20.0
34	Motor vehicles, trailers, semi-trailers	0	14	14	0.0
	Other transport equipment	0	0	0	0.0
36	Furniture; manufacturing n.e.c.	3	403	406	6.9
	Nepal (Total)	**283**	**3793**	**4076**	**6.9**
	Nepal (%)	**6.9**	**93.1**		

Table A-22: Status of sound pollution control machine installation

ISIC rev3 code	Description	Installation Status			Percent
		Yes	No	Total	
15	Food and beverages	22	1043	1065	2.1
16	Tobacco products	1	29	30	3.3
17	Textiles	2	286	288	0.7
18	Wearing apparel, fur	2	69	71	2.8
19	Leather, leather products and footwear	0	50	50	0.0
20	Wood products (excl. furniture)	2	317	319	0.6
21	Paper and paper products	3	89	92	3.3
22	Printing and publishing	4	90	94	4.3
23	Coke, refined petroleum products, nuclear fuel	0	6	6	0.0
24	Chemicals and chemical products	5	127	132	3.8
25	Rubber and plastic products	6	231	237	2.5
26	Non-metallic mineral products	11	923	934	1.2
27	Basic metals	2	39	41	4.9
28	Fabricated metal products	1	232	233	0.4
29	Machinery and equipment n.e.c.	0	26	26	0.0
31	Electrical machinery and apparatus	0	33	33	0.0
32	Radio, television and communication equipment	1	4	5	20.0
35	Other transport equipment	0	0	0	0.0
36	Furniture; manufacturing n.e.c.	2	404	406	1.6
	Nepal (Total)	**64**	**4012**	**4076**	**1.6**
	Nepal (%)	**1.6**	**98.4**		

Table A-23: Status of radiation control machine installation

ISIC rev3 code	Description	Installation Status			Percent
		Yes	No	Total	
15	Food and beverages	8	1057	1065	0.8
16	Tobacco products	0	30	30	0.0
17	Textiles	2	286	288	0.7
18	Wearing apparel, fur	1	70	71	1.4
19	Leather, leather products and footwear	0	50	50	0.0
20	Wood products (excl. furniture)	0	319	319	0.0
21	Paper and paper products	0	92	92	0.0
22	Printing and publishing	0	94	94	0.0
23	Coke, refined petroleum products, nuclear fuel	0	6	6	0.0
24	Chemicals and chemical products	3	129	132	2.3
25	Rubber and plastics products	1	236	237	0.4
26	Non-metallic mineral products	3	931	934	0.3
27	Basic metals	1	40	41	2.4
28	Fabricated metal products	1	232	233	0.4
29	Machinery and equipment n.e.c.	0	26	26	0.0
31	Electrical machinery and apparatus	0	33	33	0.0
32	Radio, television and communication equipment	0	5	5	0.0
34	Motor vehicles, trailers, semi-trailers	0	14	14	0.0
36	Furniture; manufacturing n.e.c.	0	406	406	0.0
	Nepal (Total)	**20**	**4056**	**4076**	**0.5**
	Nepal (%)	**0.5**	**99.5**		

Table A-24: Status of sewerage system or sublimating residuals pond management

ISIC rev3 code	Description	Installation Status			Percent
		Yes	No	Total	
15	Food and beverages	84	981	1065	7.9
16	Tobacco products	2	28	30	6.7
17	Textiles	23	265	288	8.0
18	Wearing apparel, fur	9	62	71	12.7
19	Leather, leather products and footwear	9	41	50	18.0
20	Wood products (excl. furniture)	10	309	319	3.1
21	Paper and paper products	9	83	92	9.8
22	Printing and publishing	3	91	94	3.2
23	Coke, refined petroleum products, nuclear fuel	1	5	6	16.7
24	Chemicals and chemical products	27	105	132	20.5
25	Rubber and plastic products	37	200	237	15.6
26	Non-metallic mineral products	35	899	934	3.7
27	Basic metals	6	35	41	14.6
28	Fabricated metal products	18	215	233	7.7
29	Machinery and equipment n.e.c.	3	23	26	11.5
31	Electrical machinery and apparatus	5	28	33	15.2
32	Radio, television and communication equipment	0	5	5	0.0
34	Motor vehicles, trailers, semi-trailers	0	14	14	0.0
35	Other transport equipment	0	0	0	0.0
36	Furniture; manufacturing n.e.c.	4	402	406	1.0
	Nepal (Total)	**285**	**3791**	**4076**	**7.0**
	Nepal (%)	**7.0**	**93.0**		

Table A-25: Status of solid wastes management

ISIC rev3 code	Description	Management status			Percent having management
		Yes	No	Total	
15	Food and beverages	135	930	1065	12.7
16	Tobacco products	3	27	30	10.0
17	Textiles	38	250	288	13.2
18	Wearing apparel, fur	14	57	71	19.7
19	Leather, leather products and footwear	9	41	50	18.0
20	Wood products (excl. furniture)	16	303	319	5.0
21	Paper and paper products	10	82	92	10.9
22	Printing and publishing	24	70	94	25.5
23	Coke, refined petroleum products, nuclear fuel	2	4	6	33.3
24	Chemicals and chemical products	25	107	132	18.9
25	Rubber and plastics products	47	190	237	19.8
26	Non-metallic mineral products	47	887	934	5.0
27	Basic metals	9	32	41	22.0
28	Fabricated metal products	20	213	233	8.6
29	Machinery and equipment n.e.c.	3	23	26	11.5
31	Electrical machinery and apparatus	6	27	33	18.2
32	Radio, television and communication equipment	1	4	5	20.0
34	Motor vehicles, trailers, semi-trailers	0	14	14	0.0
35	Other transport equipment	0	0	0	0.0
36	Furniture; manufacturing n.e.c.	26	380	406	6.4
	Nepal (Total)	**435**	**3641**	**4076**	**10.7**
	Nepal (%)	**10.7**	**89.3**		

Table A-26: Status of reuse or recycle the metal or non-metal scraps produced by industry

ISIC rev3 code	Description	Reuse or recycle the metal or non-metal scraps			Percent of reuse or recycle
		Yes	No	Total	
15	Food and beverages	9	1056	1065	0.8
16	Tobacco products	0	30	30	0.0
17	Textiles	3	285	288	1.0
18	Wearing apparel, fur	2	69	71	2.8
19	Leather, leather products and footwear	6	44	50	12.0
20	Wood products (excl. furniture)	1	318	319	0.3
21	Paper and paper products	5	87	92	5.4
22	Printing and publishing	2	92	94	2.1
23	Coke, refined petroleum products, nuclear fuel	0	6	6	0.0
24	Chemicals and chemical products	1	131	132	0.8
25	Rubber and plastic products	58	179	237	24.5
26	Non-metallic mineral products	6	928	934	0.6
27	Basic metals	3	38	41	7.3
28	Fabricated metal products	7	226	233	3.0
29	Machinery and equipment n.e.c.	2	24	26	7.7
31	Electrical machinery and apparatus	1	32	33	3.0
32	Radio, television and communication equipment	0	5	5	0.0
34	Motor vehicles, trailers, semi-trailers	0	14	14	0.0
35	Other transport equipment				0.0
36	Furniture; manufacturing n.e.c.	8	398	406	2.0
	Nepal (Total)	**114**	**3962**	**4076**	**2.8**
	Nepal (%)	**2.8**	**97.2**	**100.0**	

Table A-27: Status of having pollution control certificate

ISIC rev3 code	Description	Pollution control certificate			Percent
		Yes	No	Total	
15	Food and beverages	36	1029	1065	22.64
16	Tobacco products	0	30	30	0.00
17	Textiles	0	288	288	0.00
18	Wearing apparel, fur	2	69	71	1.26
19	Leather, leather products and footwear	3	47	50	1.89
20	Wood products (excl. furniture)	4	315	319	2.52
21	Paper and paper products	6	86	92	3.77
22	Printing and publishing	2	92	94	1.26
23	Coke, refined petroleum products, nuclear fuel	1	5	6	0.63
24	Chemicals and chemical products	14	118	132	8.81
25	Rubber and plastic products	12	225	237	7.55
26	Non-metallic mineral products	66	868	934	41.51
27	Basic metals	4	37	41	2.52
28	Fabricated metal products	6	227	233	3.77
29	Machinery and equipment n.e.c.	0	26	26	0.00
31	Electrical machinery and apparatus	1	32	33	0.63
32	Radio, television and communication equipment	0	5	5	0.00
34	Motor vehicles, trailers, semi-trailers	0	14	14	0.00
35	Other transport equipment				0.00
36	Furniture; manufacturing n.e.c.	2	404	406	1.26
	Nepal (Total)	**159**	**3917**	**4076**	**100.00**
	Nepal (%)	**3.9**	**96.1**	**100.0**	

Table A-28: Expenditure on different types of environment protection activities by ISIC rev 3 classification, 2012

ISI-Crev.3 Code	Description	Polluted air, gas	Smoke and dust	Sound pollution	Industrial radiation	Sewerage management or sublimating residuals	Managing solid wastes	Environment protection	Recycling wastes	Total expenditure in Rs '000'	Per cent
15	Food and beverages	2,425	2,033	2,729	5,520	2,046	10,147	74,795	767	170,462	11.11
16	Tobacco products	28	59	4		58	-	4		153	0.01
17	Textiles	11	565	-	-	553	753	100,300	502	102,684	6.69
18	Wearing apparel, fur	200	140	100	-	133	182	225,052	80	225,887	14.72
19	Leather, leather products and footwear		100			91	338	1,565	120	2,214	0.14
20	Wood products (excl. furniture)	-	632	120		628	718	660	-	2,758	0.18
21	Paper and paper products		179	1,200		175	11,614	21,758	15,155	50,081	3.26
22	Printing and publishing		187	37		185	1,358	18,064	-	19,831	1.29
23	Coke, refined petroleum products, nuclear fuel	-	10			11	-	25		46	0.00
24	Chemicals and chemical products	530	247	830	-	237	2,908	8,068	-	12,820	0.84
25	Rubber and plastic products	780	458	1,890	-	437	9,557	2,630	44,392	60,144	3.92
26	Non-metallic mineral products	4,268	1,763	1,625	1,050	1,833	14,268	777,843	25,853	828,503	53.99
27	Basic metals	15	77	100	-	76	2,746	21,000	50	24,064	1.57

Contd..

ISI-Crev.3 Code	Description	Polluted air, gas	Smoke and dust	Sound pollution	Industrial radiation	Sewerage management or sublimating residuals	Managing solid wastes	Environment protection	Recycling wastes	Total expenditure in Rs 000	Per cent
28	Fabricated metal products	5,556	460	-	-	448	749	273	21,592	29,078	1.89
29	Machinery and equipment n.e.c.	30	51			49	50	135	102	417	0.03
31	Electrical machinery and apparatus	1,925	62			61	109	247	150	2,554	0.17
32	Radio, television and communication equipment		9	-		10	3	-		22	0.00
34	Motor vehicles, trailers, semi-trailers		28			28		-		56	0.00
35	Other transport equipment										0.00
36	Furniture; manufacturing n.e.c.	135	809	30		808	531	316	70	2,699	0.18
	Nepal (Total)	**15,903**	**7,869**	**8,665**	**76,570**	**7,867**		**1,252,735**	**108,833**	**1,534,473**	**100.00**
	Nepal (%)	**1.04**	**0.51**	**0.56**	**4.99**	**0.51**	**3.65**	**81.64**	**7.09**	**100.00**	

Table A-29: Impact by Environment Act on manufacturing establishments

ISIC rev 3 code		Very positive	Positive	No effect	Negatve	Very negative	Not reported	Total
15	Food and beverages	8	396	577	33	5	46	1065
16	Tobacco products	2	14	12	1	0	1	30
17	Textiles	2	66	189	14	3	14	288
18	Wearing apparel, fur	0	21	44	1	0	5	71
19	Leather, leather products and footwear	0	15	28	4	0	3	50
20	Wood products (excl. furniture)	2	92	204	12	3	6	319
21	Paper and paper products	0	31	47	7	2	5	92
22	Printing and publishing	0	30	53	5	0	6	94
23	Coke, refined petroleum products, nuclear fuel	1	0	5	0	0	0	6
24	Chemicals and chemical products	4	61	54	3	5	5	132
25	Rubber and plastic products	4	81	121	13	6	12	237
26	Non-metallic mineral products	19	384	456	57	6	12	934
27	Basic metals	0	16	24	1	0	0	41
28	Fabricated metal products	1	67	147	8	4	6	233
29	Machinery and equipment n.e.c.	1	7	14	2	1	1	26
31	Electrical machinery and apparatus	0	13	17	2	0	1	33
32	Radio, television and communication equipment	0	4	1	0	0	0	5
34	Motor vehicles, trailers, semi-trailers	0	3	9	0	0	2	14
35	Other transport equipment							
36	Furniture; manufacturing n.e.c.	6	88	279	17	5	11	406
	Nepal (Total)	**50**	**1389**	**2281**	**180**	**40**	**136**	**4076**
	Nepal (%)	**1.2**	**34.1**	**56.0**	**4.4**	**1.0**	**3.3**	**100.0**

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