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Towards an Understanding of Business Systems in Kenya: The Concept and Research Issues in Metal Products Sub-sector

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1.0 Introduction

This concept paper on the metal products sub-sector in Kenya presents a review of the metal sub-sector, analytical framework, objectives of the collaborative study and methodology to be applied in the study. The planned study is part of a wider research project on business systems in Africa being undertaken by the Institute for Development Studies, University of Nairobi and the Centre for Development Research, Copenhagen. The study is expected to contribute to the understanding of the business systems and enlighten policy makers on how they can use this approach to address socio-economic issues in Kenya's industrialisation efforts.

The business systems approach is based on a broader context of institutional dynamics, as the key factors that influence the performance and outcome of economic actors. The approach will be used to analyse and understand the characteristics of the metal products sub-sector in Kenya. The approach is one of the new trends in economic analysis based on the new institutional economics (NIE) theory. It is a significant departure from the dominance of the conventional approach, based on the concepts of economic rationalism embedded in the neo-classical economic theory. The strength of NIE, and hence adoption of business systems approach compared to the neo-classical theory, derives from its wider scope, which allows the integration of institutions, other than markets and governments, into economic analysis. Thus the approach is based on the perspective that economic activities and behaviour are socially embedded and that they are likely to differ under different institutional contexts.

The study will include a number of activities and outputs. The first activity, which enabled the production of this paper, involved a detailed secondary data collection and review of literature. The aim of this activity was to identify the nature of the metal sub-sector in terms of activities, products, regional distribution and import-export linkages among others. The second activity will be fieldwork, which will be undertaken in two phases. Phase one of the fieldwork will involve a scoping exercise to identify firms and establish their existence, location and activities in the sector. Phase two will involve a detailed field survey consisting of both administering structured questionnaires, conducting of in-depth interviews on key informants with the central aim of identifying inter-firm linkages between the different systems.

2.0 A Review of the Metal Sub-Sector

The metal products sub-sector falls under the manufacturing sector, which has an important role to play in Kenya's economy, especially with respect to the

country's industrialisation strategy. The manufacturing sector is expected to be more dynamic in accelerating economic growth in the country (Kenya, 1997). This is especially through employment creation, linkages between firms (and across regions), skill formation and export earnings. The metal products sub-sector is one of the main sub-sectors in manufacturing, after food, beverages, and tobacco, chemicals, rubber and petroleum products. It, therefore, has an important role to play in manufacturing and Kenya's industrialisation process, in general.

The main activities of the sector include: basic metal manufacture, manufacture of furniture and fixtures, hand tools, and general hardware, structural metal products, fabricated metal products, electrical machinery and appliances, and railroads equipment. The main products produced by the sector include: ferrous metals such as cast and wrought iron and steel products, and non ferrous metals like aluminium, antimony, cadmium, copper, led, zinc and tin. Kenya's iron and steel industry produces a wide range of products like hot-rolled and galvanised steel products, and manufactured steel pipes. Others include the manufacture of simple products such as *jikos* (charcoal cooking stoves), pans and fabrication of simple capital goods like storage tanks, farm implements, repair and maintenance of vehicles and processing machinery. Due to the diverse nature of the sector, this study focuses on only three sub-sub-sectors namely, structural metal products, fabricated metal products and metallic furniture and fixtures.

An important feature of the manufacturing sector in Kenya is the presence of small-scale enterprises, from the informal sector. The importance of this sector, in employment creation and incomes, has been recognised by the government as reflected in various policy documents. During the last decade, the importance of the informal sector has increased significantly, especially as a source of employment. As the formal sector employment has declined, the informal sector's share in total employment has risen steadily, reaching 70.4 per cent in 2000 (Kenya, 2000). However, the *Jua kali sector* has suffered from a number of constraints, major among which have been poor policy and co-ordination issues as well as legal and regulatory environment (ILO/EAMAT, 1999).

2.1 The Sub-Sector's Performance

The metal products sub-sector has experienced positive growth from the mid-1980s up to the 1990s mainly due to the changing policy environment. As a result, the sub-sector registered positive changes between 1993 and 1997. During the 1970s, the sub-sector enjoyed protection from competition, which resulted in inefficiencies and high capacity under-utilisation (Coughlin, 1991). This was largely the result of the Import Substitution Industrialisation (ISI) strategy pursued during this period. This strategy saw the protection of domestic industries from external competition, encouraged capital-intensive production technology, and limited the industrial manufacturing sector's potential to generate employment.

By the mid-1980s, the scope for ISI had been exhausted due to diminishing opportunities for ISI domestically. Due to the heavy protection, and inefficiencies in production and the accumulation of excess capacity, the sector's products failed to penetrate external markets. The production level in the metallic products sub-sector declined steadily in the early 1980s. It declined by 4.1 per cent in 1980, 17.1 per cent in 1981 and 15.5 per cent in 1982 (Kenya, 1980), picking up again in 1983, which continued until 1992 when it registered another decline. This changed gradually with the implementation of changes in the macro-economic policy framework/environment.

The metal products industry has experienced improvements in performance since 1990 mainly attributed to the availability of foreign exchange and the liberalisation of the economy. The stable and liberalised economy with the removal of import restrictions, as well as the stability of the Shilling against the major currencies provided the sub-sector with an easy and stable access to raw materials. The *Jua kali* sector, which is a major user of metal products also contributed to the good performance of the sector (Kenya, 1995). This resulted in the sub-sector registering a growth in real output of 21.2 per cent between 1996 and 1997 (Kenya, 1998). Specifically, galvanised iron sheets rose by 12.7 per cent between 1996 and 1997, iron rods and bars recorded growth of 5.9 per cent from 38.9 thousand tonnes in 1996 to 41.2 thousand tonnes in 1997.

Table 1 in the appendix shows the percentage changes in the growth of the sub-sector over the 1979-1997 period. There was a general negative trend between 1980 and 1983. This compares to the positive growth rates recorded after this, except in 1992 when there was a marked negative growth.

One of the main reasons for the negative growth in the sub-sector during this period was a slowdown in the construction activity, and the local demand for its products and the general slowdown in economic activity of 1982. An increase in the local demand for metal products, and its linkage to the informal sector, largely contributed to the sector's positive growth in the 1990s.

During the year 2001, the performance of the manufacturing sector declined by 1.5 per cent, mainly due to the devastating effects of power rationing. The decline in power supply to the sector led to reduced capacity utilisation, leading to decreased output, loss of jobs and an increase in product prices. In the metal industry output declined sharply by 29.1 per cent. Production of galvanised iron sheets, which contributed about 57 per cent of the total output of the metal industry, declined significantly, while production of metal cans and tins also recorded a significant drop, due to the weak demand in the packaging industry (Kenya, Economic Survey, 2001).

However, the performance of the metal products sub-sector should be viewed in the context of the overall development policy for the manufacturing sector in the country. The manufacturing sector received support within the ISI paradigm on basis of the perceived importance of the manufacturing sector for the structural transformation (modernisation) of the economy. The ISI strategy, however, failed to create the necessary dynamism within the sector. Therefore, while the manufacturing sector grew by 8.5 per cent during the 1960s and 1970s, it only grew by 4.8 per cent between 1980-89, and 3 per cent for the period 1990-1995. This was hardly enough to absorb the surplus labour from the agricultural sector and generate linkages with the rest of the economy (ILO/EAMAT, 1999). The resulting inefficiency, in the sector, and lack of competitiveness of its products, led to the review of the ISI industrial strategy and its investments incentive structure. The government adopted structural adjustment programmes (SAPs), with increased reliance on market forces. The ISI was thus abandoned in favour of export oriented industrialisation strategy.

2.2 The Sub-sector's Contribution to the National Economy

The metal products sub-sector is an important contributor to the national economy. This is in terms of its contribution to Gross Domestic Product (GDP), employment generation, skill development and promotion of inter-firm linkages. It also contributes to the generation of foreign exchange through the manufacture of products for export. This sub-section of the paper gives an overview of the sub-sector's contribution to the national economy in terms of GDP and employment. The sub-sector's contribution to GDP and employment largely reflects not only trends in its performance, but also its overall contribution to the economy.

2.2.1 Contribution to GDP

The metal industry has experienced a steady decline in its share of the manufacturing sector, from 7.1 per cent in 1982 to 4.3 per cent in 1994. Table 1 gives the structure of the manufacturing sector for the period 1982-1994, highlighting the position of the metal products.

The table shows that the sub-sector has experienced a steady decline in its share of in manufacturing, despite the rising index in production over the same period (figure 1). Figure 1 shows the quantity index of manufacturing production for metallic products between 1990 and 2000.

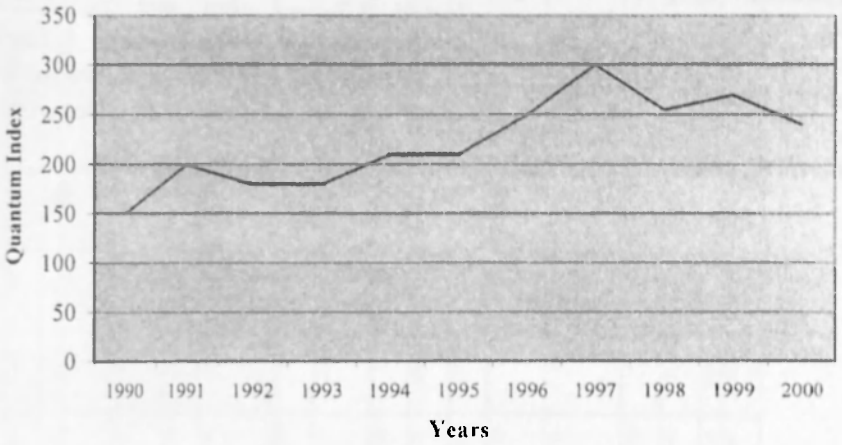
Table 1: Structure of the manufacturing sector: 1982-1994 (percentage shares)

Industry	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Food beverages and tobacco	35.6	40.9	42.3	43.2	44.2	44.0	42.4	42.4	45.8	45.8	46.5	46.3	46.2
Clothing textile and leather	7.3	7.6	6.8	7.2	7.3	6.8	6.3	5.6	3.3	5.4	4.0	4.1	4.0
Wood and furniture	2.2	2.3	2.3	2.1	1.8	1.4	1.3	1.3	2.3	1.2	1.3	1.3	1.3
Paper and printing	5.4	5.2	5.1	4.2	3.6	3.3	2.9	2.8	3.0	3.2	3.0	2.8	3.9
Chemical, Rubber & Petroleum	23.9	21.7	22.2	21.8	22.5	22.5	27.0	27.2	25.2	24.7	27.5	27.5	27.5
Plastic, glass and non-metallic minerals	5.0	4.8	4.6	4.2	3.6	4.3	3.9	5.3	5.1	4.3	5.1	5.4	5.4
Metal products	7.1	6.9	6.7	6.8	7.0	6.6	6.0	4.9	4.5	6.3	4.4	4.3	4.3
Machinery	4.6	4.2	3.8	3.9	3.8	3.9	3.5	3.9	4.9	3.6	3.7	3.6	3.6
Transport equipment	8.2	5.9	5.6	5.9	5.7	6.2	5.8	5.5	4.6	4.0	4.2	4.4	4.4
Miscellaneous	0.7	0.6	0.7	0.9	0.9	0.9	0.9	1.2	1.3	1.6	0.3	0.3	0.3

Source: Statistical Abstracts, various issue

Figure 1 shows that the metallic products have experienced a steady increase in production between 1990 and 1997 except in 1992 and 1993 when it registered a decline. This is attributed to the adverse effects posed by the shortage of foreign exchange during this period. However, since 1998 there has been a general downward trend in production, mainly due to structural problems and weak demand in the economy. Among the issues in the sector contributing to the massive under-utilisation of the installed capacity is tied aid for some donor-funded projects. This was identified as one of the factors reducing the demand for various products being produced in the country (Coughlin, 1988).

Figure 1: Quantum Index of Manufacturing Production: Metalic Products 1990-2000



Source: Own Survey Data

However, the metal products sub-sector has been given considerable priority, based on its expected contributions to the economy. The manufacturing sector in general, and the metal products sub-sector in particular, is expected to have a significant contribution to Kenya's industrialisation process through employment opportunities, savings of foreign exchange and creation of forward and backward linkages. In the Sessional Paper Number 1 of 1986, on Economic Management for Renewed Growth, the manufacturing sector was expected to attract and generate indigenous Kenyan entrepreneurs, especially in the informal sector (Kenya, 1986). As at 1997, the informal sector's manufacturing enterprises engaged 27 per cent of the total informal employment in Kenya (Kenya 1997). Given the metal products sub-sector's importance in the informal sector, it is expected to take a large share in absorbing the surplus labour.

2.2.2 Contribution to Employment

The metal products sub-sector is recognised as having a large employment creation potential mainly due to its linkages with firms in smaller urban centres. This is mainly due to the manufacture of simple metal products. The sub-sector is one of the major contributors to employment in the manufacturing sector. Its share of employment in the manufacturing sector, however, declined from about 25 per cent in 1980 to 20 per cent in 1997 (Table 2).

Among the major contributors of the industry, in terms of employment, in 1980 were manufacture of fabricated products like machinery and equipment, (contributing about 17.9 per cent) and manufacture of structural metal products (with 6.9 per cent). In 1990, the two sub-sectors were still among the top contributors, despite the significant decline in growth (manufacture of fabricated metal products contributed 3.7 per cent, and manufacture of structural metal products contributed 1.7 per cent). Manufacture of fabricated metal products and the manufacture of railroad equipment remained the leading activities in the metal industry between 1980 and 1990 (Department of Economics, 1994).

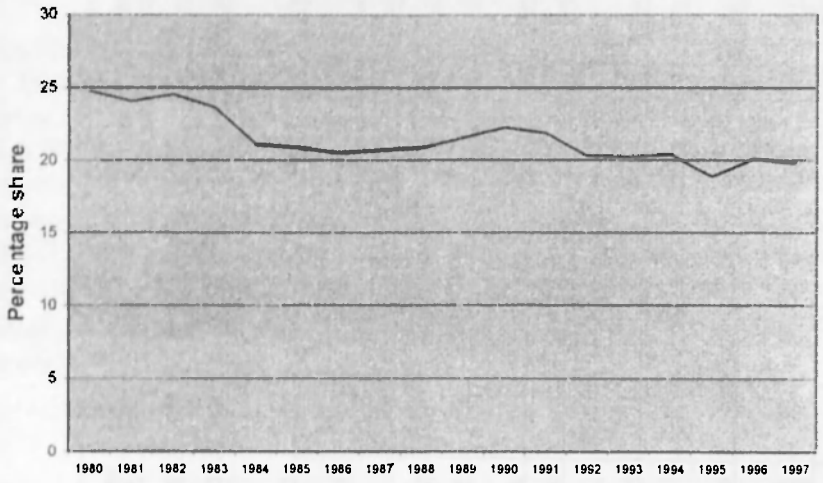
Table 2: Wage employment in metal industry (1980-1997)

Manufacturing Activity	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Basic metal industry	1811	2199	1996	1968	2091	2186	2110	2772	3135	4737	5337	5507	5600	5614	5684	5774	5865	5880
Man. of cutlery, hand-tools and general hardware	456	548	427	416	520	532	517	519	526	720	882	809	815	850	893	950	1028	1072
Man. of furniture & fixtures primarily of metal	1549	1279	1078	1167	747	726	968	832	760	808	852	871	892	911	901	918	938	958
Man. of structural metal products	2421	2321	2404	2817	2396	2286	2249	2832	2892	3176	3197	3237	3241	3252	3264	3295	3380	3392
Man. of fabricated metal products except machinery and equipment	6294	6674	6108	5315	5720	6329	6289	6256	6218	6274	6919	6971	7028	7188	7404	8010	8300	8489
Man. of machinery except electrical	1061	1307	1245	1271	1309	1349	1357	1633	1687	1574	1489	1477	1479	1492	1506	1502	1520	1533
Man. of electrical machinery and appliances	1564	1707	2355	1952	1896	2232	211	2034	2077	2124	2369	2591	2771	2799	2834	3218	3219	3252
Ship building & repairing	1040	1197	669	509	635	465	390	384	381	488	468	506	506	499	521	547	569	561
Man. of rail road equipment	12406	11903	13820	13609	12017	11813	12135	12014	11789	11562	12890	12209	12000	11219	11331	11320	11089	10758
Man. & assembly of motor vehicles	3794	3742	3328	3432	2886	2923	3224	3374	3559	3640	3591	3496	3472	3487	3265	3275	3327	3396
Man. & assembly of motorcycles & bicycles	84	134	70	75	58	58	30	29	23	2	2	2	2	2	3	3	0	0
Man. of professional & scientific equipment, photographic & optical goods	181	325	185	163	158	177	152	151	108	181	181	150	160	151	149	152	167	158
Man. and repair of aircraft	783	771	848	870	107	218	149	137	142	128	128	214	160	151	266	292	319	329
Other manufacturing industries	1109	1163	1563	1624	1834	1954	1944	2118	3126	3266	3592	3325	223	244	3469	3579	3727	3768
Total (Metal works)	**35683**	**35270**	**36096**	**35188**	**32374**	**33248**	**33625**	**35085**	**36433**	**38680**	**41897**	**41365**	**38349**	**37859**	**41490**	**39887**	**43448**	**43546**
Total manufacturing sector	**141280**	**146338**	**146780**	**148758**	**153145**	**158763**	**163903**	**169210**	**174093**	**178695**	**187683**	**198873**	**188917**	**192087**	**203528**	**210775**	**216411**	**220481**

Source: Statistical Abstracts and Economic Survey (various issues)

Table 2 shows the trend of wage employment in the metals sub-sector and its share in total employment in the manufacturing sector from 1980 to 1997, while Figure 2 shows the trend in the share of metal products in total manufacturing for the same period.

Figure 2: Share of metal products in total manufacturing (1980-1997)



Source: Own Survey Data

It is, however, important to note that the sector's potential to generate employment has largely been determined by the overall industrial policy pursued immediately after independence. The ISI strategy, adopted for the manufacturing sector, relied on capital-intensive production technology, which resulted in limited employment opportunities. The strategy also made the sector to heavily rely on imported raw materials. As a result, the sector developed little linkages with the domestic economy, thus limiting its potential to generate economic activities in other sectors and, therefore, employment (ILO/EAMAT 1999).

2.3 *Skill Composition in the Sub-sector*

The composition of skills in the sub-sector varies depending on the size of the firms and ownership. While large firms have a well-defined structure of employment in terms of skills, the smaller ones do not. Firms producing standardised goods mostly recruit manual workers to work on the assembly lines. Large firms producing products that are not standardised and craft-based depend heavily on technicians, while small firms depend on craft based workers.

In foreign-owned firms, most of the management staff are expatriates. Asian-owned firms mainly recruit their Asian counterparts to the management ranks, leaving the lower ranks for the African locals. In the locally-owned firms, skills are distributed according to product-type and qualifications. This is as compared to the informal sector, which mainly relies on craft workers.

Generally, most of the firms in the sub-sector are dominated by Kenyan Indians, who command about 60 per cent ownership. Multinational Corporations (MNC) mainly own large firms in the sub-sector, with the state controlling a very small percentage of the firms. The high capital input in the sub-sector has also meant that most locals (Kenyans) are only involved in small-scale firms and workshop-based firms, mainly in fabricating, repairs and *Jua kali* based artisanal activities.

2.4 Import-Export Linkages of the Sub-sector

A notable factor in the industry is that exports are insignificant as compared to its imports. Out of an annual consumption of over 250,000 tonnes of steel, 225,000 is imported. The manufacturing activities for basic metals, involve the converting of basic imported materials and the recycling, of scrap metal into structural steel and other products. The industry's heavy dependency on imported raw material is mainly attributed to the country's lack of large deposits of iron or other metallic ores. This has contributed to the low levels of value adding in some of the activities in the industry. The metal industry was also largely oriented to meet the domestic requirements, while exporting was not given priority until the introduction of incentives in the form of retention accounts for exporters (Department of Economics, 1994).

The sub-sector is highly import-dependent, with most of the imports constituting raw materials, spare parts and capital goods. Due to lack of key raw materials, like iron ore and coal in Kenya, the metal products sub-sector is dependent on imported materials and inputs. Imported materials include wire rods, nail wire, steel wire, zinc, hydrochloric acid and drawing lubricants. However, some raw materials are obtained from local firms. The locally obtained raw materials include cold rolled steel plates, hot rolled steel plates, steel rods, galvanised steel sheets, as well as round and square bars, among others. Suppliers of imported inputs are found within Eastern and Southern Africa as well as Europe and India. Most of the firms in fabrication and furniture and fixtures, however, get most of their raw materials locally (within the country), and mostly in the same towns, since they mainly use products of the structural metals sub-sector.

In terms of exports, neighbouring countries within the East African region, offer the major destinations. Other products are destined to the COMESA countries. Most firms also sell their products locally (in the country) and mainly in the towns. These are firms mainly in the fabricated and furniture and fixtures sub-sector. The sector does not, therefore, appear to have any significant linkages with other sectors in the economy.

2.5 Policies on the Manufacturing Sector

Since independence, the government has given priority to the metal products sub-sector. The establishment of institutions like the Industrial Development Bank (IDB), the Development Finance Company of Kenya (DFCK), and the Industrial and Commercial Development Corporation (ICDC), among others, to provide financial assistance to metal manufacturing industries, illustrates this.

Initially, the government's policy of import substitution industrialisation was aimed at encouraging the growth of domestic industries by protecting them from imports. This has shifted gradually to export promotion. The Sessional Paper Number I of 1986 on *Economic Management for Renewed Growth* outlined policies that entailed efforts to accelerate the pace of import liberalisation, by lifting import restrictions, gradually reducing duty rates and improving incentives for exports, aimed at to increasing the country's export earnings (Kenya, 1986).

The building of a self-sustaining, export-oriented, industrial sector has been a central focus of the country's industrial development policy. The policy measures in the programme were aimed at removing the anti-export bias inherent in the past policies. The main export incentive schemes, put in place for this purpose, were duty remission, Export Processing Zones (EPZ), manufacture under bonds and export compensation. These schemes were aimed at making the Kenyan exports competitive in the international markets (IPRE/JFA, 2000).

The government's objective for the metal industry is to enhance efficiency and competition, both in the domestic and export markets through increased emphasis of export promotion in the manufacturing sector. The Sessional Paper Number 2 of 1997 on *Industrial Transformation to the Year 2020* places the metal industry among the industries targeted in the efforts to attain the NIC status. In order to provide an enabling environment for the growth and expansion of the metals sub-sector, policies, mainly related to exports and investment promotion, extension of regional co-operation, improved infrastructure, labour legislation reforms, price decontrol and reduction of import tariffs, have been put in place. Specific policies that have been embraced by the government to promote the sector include:

- Abolition of foreign exchange controls.
- Reforming of tariffs.
- Removal of laws, procedures and regulations that restrict imports and discourage exports.
- Setting up of the Export Promotion Council.

The small and micro-enterprises play a very important role in Kenya's economy. Given this importance, there has been support programmes put in place to promote the *Jua Kali* enterprises. These have included the establishment of the District Development Fund, aimed at providing an enabling infrastructure through the development of the Rural Trade and Production Centres, and the Rural Enterprise Fund to finance *Jua Kali* enterprises. There also have been investment allowances, exemption of duties and allowance on imported capital equipment. These policies, however, have not achieved much. Through the publication of the Sessional Paper Number 2 of 1992, the government identified a number of factors, which inhibit the development of micro and small enterprises. These included: lack of coherent policy guidelines, lack of management skills, lack of credit, poor technology, weak institutional infrastructure and poor marketing. A number of investment incentives, aimed at encouraging the development of the sector were identified as:

- Provision of investment incentives for industries outside Nairobi and Mombasa.
- The construction of the *Nyayo* sheds to accommodate *Jua kali* artisans in rural areas.
- Exemption from import duty on capital machinery for small enterprises in rural areas where the cost of such machinery does not exceed Kshs 2 million.

The Sessional Paper Number 2 of 1997 on *Industrial Transformation to the Year 2020* stresses the support needed in order to promote the small and Micro-Enterprises in the metal products sub-sector. The country's development finance institutions are expected to provide finance to small and medium scale enterprises that cannot easily access credit from commercial banks.

2.6 Regional Distribution of Firms

Metal working enterprises are spread out all over the country, but most of them are based in large and medium size urban areas. They are mostly concentrated in Nairobi and Mombasa. Other urban centres like Kisumu, Thika, Nakuru and Eldoret also host some of the firms. Nairobi alone has 65 per cent of both large

and small firms, Mombasa 15 per cent, Nakuru 3 per cent, Kisumu 3 per cent, Thika 2 per cent, Eldoret 1.5 per cent and Machakos 2 per cent. Most small towns do not have formal metal enterprises, but are instead dominated by *Jua Kali* type of firms. In terms of firm size, most large firms are located in big urban centres, Nairobi having approximately 75 per cent of such firms, and Mombasa having 15 per cent. Table 3 gives the regional distribution of the large and small metal-manufacturing firms, especially in the major towns.

Table 3: Regional distribution of large and small metal manufacturing firms

Towns	*Number*	*Percentage Share*
Nairobi	269	65
Mombasa	62	15
Nakuru	13	3
Kisumu	12	3
Thika	10	2
Eldoret	6	1.5
Machakos	8	2
Kakamega	3	0.75
Athi River	2	0.75
Kikuyu	3	0.75
Nyeri	5	1.25
Others	20	5
Total	**413**	**100**

Source: Central Bureau of Statistics files, (1999).

The regional distribution of these firms is influenced by many factors. The availability of reliable infrastructure, like railway and road transport, electricity and available market for the products are important. These factors have particularly been the major determinants on the location of firms in Mombasa and Nairobi. The economies of scale, and availability of skilled labour have also been important factors in the location of these firms in the two major towns. The location in these two towns also means that they can supply their consumers, mainly the construction industry, more conveniently. For the other towns, especially Nakuru, Eldoret and Kisumu, location has been influenced by the need to supply the western region with metal products for both industrial and agricultural purposes since Nairobi-and Mombasa-based firms have not been able to supply the region efficiently.

Small firms, in the sub-sector mainly consist of workshop and *jua kali*-based firms, and are spread all over the country. For such small firms located in small towns and market centres in rural areas, they are attracted by kinship networks, available labour, and the need to supply tools to the agricultural sector. In the urban areas, *jua kali* firms are attracted by the availability of inputs and markets.

3.0 Business Systems: Analytical Framework

3.1: Configurative Dimension

As indicated earlier in the paper, this study plans to apply the Business Systems concept and approach, based on the broader notion of institutional dynamics and the nature of their contexts, as the key determinants of performance and outcome of economic activities. Business system is defined as a specific form of economic organisation that has been reproduced in a certain institutional context and capable of determining specific ways of controlling and co-ordinating economic activities. It is perceived as a relatively cohesive and stable way of ordering the firm-market relationship that develops independently with dominant social institutions (Whitley, 1992: 175). In other words, within the context of the business systems concept, firms are not seen as nuclear units organising and operating independently, in transparent and competitive markets. Rather, they are seen as economic organisations or entities, which interact with markets in a social and institutional context. The context may be international, national, regional or local in nature.

The extent to which business systems are distinctive, integrated and differentiated, within the domain in which they exist, depends on how coherent and stable the institutional contexts within those domains are. For example, on the one extreme, where institutional systems are highly integrated and mutually supporting, as Kimuyu (1999) observes, business systems become cohesive and self-evident. On the other extreme, where for instance there is religions/ethnic heterogeneity, shifting population and boundaries, technological transfers, and institutional duplicity, distinct internally-coherent economic organizations have little chance of taking root. Examples for the two extremes are, on the one hand, the situation of East Asian societies, where it has been established that a combination of ethnic homogeneity, historical continuity, isolation from external influences, and a strong co-ordinating state led to unique business systems in the post-war period. On the other hand, the contrasting situation obtains in many European countries where extensive war-related interaction and changing state boundaries, religions and ethnic heterogeneity left little room for the development of distinct business systems (Whitly, 1996).

Using the above factors, fifteen business characteristics, grouped into three broad categories, have been identified (Muller, 1997). The categories are: (i) nature of firms as economic actors, (ii) market relations and (iii) authoritative co-ordination and control systems.

3.1.1 Nature of the firm

This factor is considered as a characteristic component of business systems, because of the perception that the nature of a firm, as a key economic actor in a particular economy and the dominant ways in which firms develop and compete, remains a distinctive element of business organization characteristics, which fall under the following categories:

- Extent of decentralisation of economic power to private sector;
- Separation of property rights and owners from management of economic activities;
- Self-sufficiency; and
- Diversity of activities and resources controlled by leading firms.

3.1.2 Market relations

The types of connections that firms develop with each other in the same industry (or markets) and across industrial or business sectors define this component of business systems. The distinctive features of this, as a characteristic attribute of business systems, derives from the fact that it is interrelated with capabilities and skills which a business system may control/enjoy or develop, and to the extent that the attribute leads to the formation of particular patterns of market organisations. Under this category are:

- Basis of inter-firm commitments, covering extent of long-term reciprocal obligations between firms;
- Significance of intermediary organisations; and
- Dependence of market relations upon personal ties covering level of market organisations, within and between sectors.

3.1.3 Authoritative co-ordination and control systems

This is the modality for authoritative co-ordination and control of resources, activities, and skills within a firm's domain. Such modality varies between business systems, as has been demonstrated by numerous studies of organisational processes and structures (See Gozier, 1964; Gallie, 1978; d'Irabarne, 1989; Maurice, *et al*, 1980, 1986; and Orru, 1991). The following elements fall under this category.

- Degree of integration and interdependence between activities;
- Impersonality of authority and subordination relations;
- Integration of formal authority with technical superiority;
- Centralisation of decision making co-ordination and control;
- Specialisation of tasks, roles and skills;
- Distance and superiority managers; and
- Employer commitment to employees and organisation-based labour systems.

The interdependent nature of the three components of business system has been emphasised in literature. For example, Whitely observes that

> *The three constituent elements of business systems are closely interconnected, since the way in which resources are managed reflects differences in their diversity and type, just as market relations are interdependent with strategic preferences and pattern of managerial recruitment and promotion (Whitley, 1992, p.18).*

On this vein, Whitley further indicates that each business system can be seen as systematic, interrelated responses to three fundamental issues of any market-based system. First, what kind of economic activities are to be authoritatively integrated and co-ordinated towards what type of priorities? Second, how are market relations, of competition and co-operation, to be organised and firms' activities connected? Third, how are economic activities to be managed in authority hierarchies? (Whitley, 1992).

In Muller's words, the list (of the elements) can not be considered exhaustive, since the characteristics are not dependent on each other, but will usually occur in certain combinations and the interdependence between them provides profiles to the way firms are organised (Muller, 1997, p.5). Based on a matrix of such combination the literature reveals that attempts have been made to identify five types of business systems.

In the first system, isolation and self-sufficiency of firms are high either because they are in situations of considerable insecurity, lack of trust and lack of stable institutional procedures governing arm-length relations. Isolation and self-reliance tend to encourage personal relationships and preference for high flexibility in production and marketing operations.

In the second system, there may be institutional differentiation and pluralism, like the Anglo-Saxon societies, with stronger institutions ordering impersonal relations which then tend to develop partitioned business systems. Financial institutions facilitate the separation of owners and managers. This can be termed as the pluralistic business systems model. The third system is constituted by economies, which have closer relations between financial institutions, state agencies, and industrial companies. Whitley terms it a collaborative system.

The fourth system is one where the state co-ordinates the economy and plays an active developmental role, but private firms retain considerable autonomy. However, top management have to maintain good relations to the state elite. This is called the co-ordinate business system. In the fifth system, the state dominates the economies and the political executives and bureaucratic elite play the leading role in co-ordinating investment strategies and resource allocation. This is the state-dependent business system (Muller, 1997, p.5). However, at present, there are few contributions of how various business systems can be placed within the five mentioned types.

As a concept, business systems is vital for the analysis and understanding of underlying linkages and relations with broader economic and business environment, and activities. As Granevetter (1985) observes, this perspective, of the embedded firm, opens up for much more differential analysis and understanding by linking the firm and the society together. In addition, Kimuyu qualifies that features that distinguish business systems, as a separate theoretical approach to the study of exchange, are distinct institutional contexts. He further emphasises the national business co-ordination and control mechanisms that evolve from relatively integrated and mutually supporting institutional arrangements, as well as historical continuity and ability to resist externally generated distortions (Kimuyu, 1999: 17).

The foregoing observation on business systems approach helps us understand linkages between institutional context and business and economic performance, as well as conduct or behaviour of businesses. The perspective that behaviour and economic activities are likely to be different under different contexts is widely acknowledged, as indicated by Kimuyu (1999).

Muller (1997) qualifies the strength of business systems as an approach by stating that the approach identifies distinctive and effective forms of economic activities, between dominant social institutions, and ways of co-ordinating economic activities, and that it includes the relationship between firms and markets (Muller 1997). This is premised on the perception that the differences in major institutions generate significant variations in how firms and markets are structured and operate (Whitley 1992).

3.2 New Institutional Economics

The concept of new institutional economics (NIE) is the theory, which underlies business systems notion and approach. It is imperative to state that the adoption of NIE, and hence business systems approach both conceptually and methodological, represents a significant departure from the dominance of conceptual approaches, which have hitherto been based on the concepts of economic rationalism, embedded on neo-classical, transaction cost, neo-Marxist

and contingency theories, among others. The strength of the NIE, as compared to neo-classical economic theory, derives from its scope that allows analysis. Neo-classical theory mainly emphasises market relations, considering markets as the major institution in determining behaviour of consumption, patterns of production, and broader economic performance in general. It focuses on the impact of price incentives on behaviour, assuming that providing the responses itself has no cost, and that access to information is perfect, as is enforcement of contracts and protection of property rights (Brautigam, 1997). Overall, in the neo-classical approach, "only markets and governments are really important. Other environmental or institutional factors are either assumed away or presumed to be the same for all economic actors" (Pedersen and McCormick, 1999).

On the other hand, NIE offers an important corrective dimension to the neo-classical approach. It does not attempt to overturn or replace neo-classical theory but builds on, modifies and extends this theory. From this perspective, the NIE theory retains, and builds on, the fundamental assumption of scarcity and hence competition. This is the basis of the choice theory approach that underlies microeconomics and rejects the concept of instrumental rationality, which is the assumption of neo-classical economics that makes it an institution-free theory.

The rationality of NIE is based on the explicit recognition that, the primary activities of production and exchange "do not happen with smoothness of the curves" implied by the neo-classical theory. Rather it occurs with respect to the exchange aspect costs that are incurred in 'providing the response'. These include: costs associated with acquisition and dissemination of information about the quality of the product that is on offer; the reliability of the sellers or buyers; negotiation costs; insurance against risks; explicit fees that may be charged; and enforcement costs that ensure the other party lives up to the bargain. In the production, Brautigam (1997) identifies these costs to include: costs involved in supervising worker output; bribing government officials to provide services coming from public-controlled infrastructure; monitoring the use of inputs and destination of outputs and ensuring levels of pilferage; controlling quality; as well as the costs of protecting the property rights.

NIE stipulates that rather than remaining dormant and being assumed away, institutions, both formal and informal affect these costs and, by so doing, they influence entrepreneurs' production and marketing decisions. Thus, over time, a society's pattern of institutional rules and regulation, and other characteristics, can channel entrepreneurial energies in distinct growth paths.

3.3 Institutions

Although it is beyond the scope of this study to empirically cover the relationship between institutions and business systems, it is necessary to conceptualise such relationships in this section. The concept of institution, within the context of the business systems notion and the attendant NIE theory, has been invariably defined (IDS/CDR proposal, 1997), while it is generally accepted that institutions exist in two categories, formal and informal. Within this variation, North (1990) perceives institutions as rules of the game in a society or, more formally, as "humane-devised constraints that shape human interaction". Thus, these include formal rules and informal codes of behaviour and norms, which have been consciously created, and those, which evolved with time. In terms of their effects on participation behaviour, North notes that institutions do structure incentives in human exchange, to ensure individual compliance with collective decisions through appropriate incentives or sanctions (North 1990:3).

Nabli and Nugent (1989) state that an institution is a set of constraints and incentives that governs the behavioural relations among individuals and groups. This is the most widely adopted definition. The strength of this definition, according to IDS (1997), lies in its broadness, which allows it to include formal organisations, markets, contracts, and cultural rules as well as codes of conduct. Different elements in the institutional environment may be identified. However, Pedersen and McCormick (1999) have identified the most important ones as:

- Financial systems;
- Social structures, processes of socialisation and educational systems;
- Market structures, infrastructure and services as well as the legal system and its enforcement; and
- Technological capabilities and innovations systems.

The way these elements function to influence business systems have been highlighted. For instance, it is indicated that financial institutions, both in their formal and informal forms, determine who gets access to credit and capital, and how and to whom enterprise management becomes financially accountable. Social structures - as well as processes of socialisation and educational systems - account for differences in management practices, trust, social responsibilities, hierarchies and delegation in the enterprise's labour market organisation. Market structures, infrastructures and services as well as legal and information systems influence contract and trust relations, collaboration and interaction among enterprises, and possibilities for externalisation and internalisation of activities in individual enterprises. Finally, it is noted that technological capabilities and innovation systems, both within individual enterprises and in

their environment, lead to differences in the way the management reacts to changes in environment.

3.4 Empirical Aspects: Business Systems and Institutional Environments

A number of studies have established that differences in the nature of business systems have evolved from the influence of variations in institutional environments. For example, Whitley (1992) found out that Japan, Korea, Taiwan and Hong Kong have recognisable national systems, which are a product of their differing histories and institutional environments. Fukuyama (1995) came to a similar conclusion with respect to the Japanese and Chinese systems, observing that "history and institutions, especially the nature of the family, have combined to create two distinct patterns of business organisations in the two countries".

Cross-national business systems' variations in Europe have also been attributed to differences in institutional environment, in respect to European countries (Kristensen, 1996). In the case of Africa, similarities in both history of governance and institutional environment are said to have contributed to similarity in features of national business systems which Pedersen and McCormick (1999) characterise as fragmented. Specifically, they note that:

> *During the last 100 years, most African countries have shared a history of colonialism and decolonisation, despite important differences in resource endowments, pre-colonial social structures, colonial rulers and settlement patterns, post-independence industrial policies and donor involvement, the business systems of many African countries have developed in remarkably similar ways. The typical African production and distribution system consists of several distinct segments: a parastatal sector, large-scale private sector and informal sector (Pedersen and McCormick, 1999, p.4).*

4.0 Statement of the Problem

Interest has emerged on business systems approach as a method of analysing and comparing performance and conduct of different economic actors. However, in the case of African countries, the existing empirical literature in the area is limited. In the Kenyan context, this can be viewed in two major ways. First, studies of business systems have been carried out in countries, which have already industrialised successfully (Muller, 1997). It is not clear, however, how the findings of these studies apply to environments such as Kenya, where industrialisation remains in its early stages. However, studies that have been done on firms within industrial economies, pose challenging opportunities to gain new insights to the understanding of the private sector in the country.

Second, few studies have been carried out in settings where the business community is not culturally or ethnically homogenous such as Kenya. In other words, besides being confined to more industrialised economies, the studies assumed that the business environment was homogeneous throughout a country, in all industries and for all entrepreneurs. This does not seem to be the case in Kenya, where there appears to be regional, sectoral and social differences in the environment faced by different entrepreneurs (IDS, 1997). Indeed, preliminary examination suggests that business in Kenya, as in other African countries, may be characterised by non-uniform sub-systems or fragments (Pedersen and McCormick 1999) consisting of parastatal sector, a formal private sector, and a small-scale or informal sector, each with its own system characteristics (IDS, 1997).

5.0 Justification

As reflected in the overview, the metal sub-sector is diverse and, in order to understand firm-market relationships and the inherent economic and social institutions, it is more appropriate to select sub-fields of the sector. Thus, this concept paper has selected three sub-fields: (i) manufacture of structural metal products, (ii) manufacture of furniture and fixtures primarily of metals, and (iii) manufacture of fabricated metal products. The metallic products sub-sector would provide material for studying different firm-types and sizes as well as various patterns of inter-firm linkages. Further, the production of building material has output links with the building industry. The three selected sub-fields are related and both partly contribute to the construction industry, stemming from rolling mills to actual final product. Additionally, the construction industry has been thriving despite the deteriorating economic conditions, and has several linkages thought to be important in understanding business systems.

At the initial development stage of this paper, it was our assumption that the manufacture of structural metal products is largely dominated by large (50 and above employees) and medium (10 - 50 employees) firms, while that of manufacture of furniture and fixtures, primarily of metal, is dominated by medium and small (0 - 10 employees) firms. Coverage of the three sub-fields will allow the research to cover all sizes of firms across the four sampled urban centres. It will also allow assessment of the existing linkages between and among firms, and with other sub-sectors (for example transport, garment and food processing) being studied by the Institute for Development Studies, University of Nairobi, and the Centre for Development Research, Copenhagen under the Kenyan Business Systems. Researching into key industrial sectors and sub-sectors will be a new contribution to understanding the industrial sector in Kenya. We further note that due to large differences (for example, capital

intensity, size of firms and gender in the work force) the selected sub-sectors are also expected to interact differently with the wider social political and economic institutions.

Apart from the above specific justifications, the general choice of the metal sub-sector is important to the socio-economic development in Kenya. For instance, manufactured goods offer high unit values and less volatile prices than agricultural and other primary sector products. Furthermore, industrial jobs promise high family incomes and improve quality of life, especially for a growing number of workers (McCormick, *et al.* 1999). In spite of this hope, the extent of industrialisation realised has not solved economic problems and there has been a re-thinking on the role of institutions in general economic development, and industrialisation is not yet clearly defined.

The need to look for alternative approaches is further underscored by the fact that the use of neo-classical economic theory in addressing problems of economic management in developing countries, particularly in Africa, is increasingly being questioned. The approach has been blamed for its limited scope with respect to the coverage of institutional relations beyond markets. On the contrary, it is widely accepted that, central to the process of economic reform and management is the role of institutions in the formation of markets and determination of economic performance in general. Specifically, Stein (1997) has linked the problem of structural adjustment - a process which is viewed as fundamental to the efficient performance and management of economies in Africa - to the limitations of neo-classical theory on which this process is based. He argues that structural adjustment, because it is derived from this theory, is basically ill equipped to promote the development of markets and the economy in Africa in general. On this vein he calls for African countries to consider the new institutional economics based approach as a more suitable alternative.

This study will contribute to the understanding of business systems in the Kenyan context and enlighten policy makers on the extent to which they can use this new approach in understanding and addressing socio-economic policy reforms and development issues, in general, and industrialisation in particular. Furthermore, the findings of this study will provide some insights on which further studies on linkages between firms and external social systems - the exchange systems, financial markets technological systems, skill development and learning system and socio-cultural systems - should be developed and carried for the identification of major institutional dynamics and contexts.

6.0 Objectives and Methodology

6.1 Objectives

The overall objective of this study is to assess the extent to which the Business Systems Approach is useful in analysing and understanding the industrial sector, for policy formulation. The specific objectives of the study include:

- Reviewing policies, general institutional regulatory framework and its effect on the sub-sector;
- Identifying and describing the elements of Kenya's business systems (nature of the firm, firm linkages, co-ordination and control), and noting regional, sectoral, and socio-cultural differences, as they affect the metallic products sub-sector in Kenya;
- Identifying and assessing export/import linkages of the metal products sub-sector and their implications for the characteristics of the sector; and
- Analysing the dynamics of the metal products sub-sector systems; the changes occurring, survival mechanisms and how the sub-sector relates with other sub-systems, in and outside the manufacturing sector.

6.2 Methodology

The working hypothesis for the planned study will be that the Kenyan metal production system is characterised by fragmentation caused by institutional discontinuities, both within the enterprise system itself and in the wider social system. The most important of these discontinuities is the division line in the production system between the large- and medium-scale industries - primarily located in the large and medium towns - and the small-scale enterprises, found in both smaller and larger urban areas. The discontinuities have resulted in the development of an inefficient formal sector, which has tended to close in on the informal sector (involute) and has neither been able to reach large sections of the national market, nor expand in the export market. At the same time, it has made it very difficult for smaller enterprises to expand into more profitable markets.

It is not, however, that the different segments of the economy do not interact, but that they do it in ways that are often highly restricted. In order to investigate the way the different segments develop and interrelate, the study intends to cover three categories of firms - large, medium and small.

6.2.1 Study sites

The study will be conducted in the city of Nairobi, one other large-size urban centre (Mombasa), one medium (Eldoret) and one small-size urban centre

(Migori). These urban centres, especially Nairobi, Mombasa, and Eldoret, have been selected due to the prevalence of manufacturing of metal products within them as shown in the overview section of this paper. Apart from this, the three towns are the major cities of Kenya, attracting a large population seeking employment within existing industries.

The other smaller town, Migori has its own unique characteristics. Migori is a rapidly growing urban centre, located close to the border of Kenya and Tanzania, within an agriculturally high-potential environment. It has a number of small-scale enterprises, which are appropriate for investigation, especially in relation to their linkage with larger firms elsewhere. Firms in Migori are largely informal (*jua kali),* and are thus not registered and documented by the Central Bureau of Statistics.

6.2.2 Sampling

The first task for the study will be to peruse secondary data, with the aim of getting a sample frame of firms operating within the four study sites. Firms will be classified into three main categories: fabricated products, structural metal products and furniture and fixtures, primarily of metal A listing of firms, according to these categories in each of the study sites, will be done using information from a number of secondary sources. These include: the Kenya Association of Manufacturers' directories; Kenya Industrial Research and Development Institute Directory of 1997, Ministry of Commerce and Industry Directory and the Central Bureau of Statistics unpublished data. This process is expected to provide a sampling frame of firms spread within the three study sites - Nairobi, Mombasa and Eldoret.

However, the directories do not list any firms operating in Migori. Therefore, the actual listing of firms in Migori will be done during the scoping exercise. Other sources that will be used to identify firms engaged in metal products in Migori are the District Trade Licensing Office, the local *Jua Kali* Association, and the local office of the Intermediate Technology Development Group (ITDG) which operates a tool-hire service to small-scale manufacturers in Migori.

The next step, after the listing of firms, will be firm identification through a scoping exercise. This process will be aimed at establishing whether the listed firms actually exist and whether they are engaged in activities against which they are listed. The exercise will also be used to identify additional firms, not listed, which operate the same activities. During the scoping exercise, information will be obtained on firm location, employment size and structure,

production capacity, products, markets, sources of inputs and inter-firm linkages, especially sub-contracting arrangements.

In addition to the survey of firms, the study will conduct in-depth studies of a total of 15 firms. In Nairobi, Mombasa, and Eldoret in-depth studies of four firms each will be conducted, while in Migori three in-depth studies will be done.

6.2.3 Data collection and analysis

Gathering information on the sampled firms will use a number of methods (secondary data, key informant discussions, in-depth/analysis of firms and a few case studies aimed at understanding business systems dynamics) depending on the issue of investigation, as indicated below:

- *Secondary data*: will rely on both published and unpublished works and provide a background of the sub-sector, approaches applied in studying the sub-sector and general information on issues of investigation.
- *Scoping*: will identify firms and establish their existence, location, and activities in the sector.
- *Key informant discussions*: will cover individuals conversant with the operations of the sub-sector, including those working within the sub-sector. Others will be drawn from the public and private, including informal sector. These informants will provide an overview of the sector, within respective urban centres, and also discuss its dynamics and potential in the process of industrialisation.
- *In-depth/case studies*: will mainly be used for gathering information on inter-firm linkages (subcontracting, competition, co-operation, marketing and linkages with government and other actors), interaction of different segments of metal sub-sector, and issues relating to capacity and productivity
- *Survey*: will be used for gathering basic statistical information on firms sampled. Information on: history, firm characteristics, linkages, labour force, social identity of owners, finance, business performance, market, association, inter-firm, import and export linkages will be gathered. The survey information is aimed at understanding the general dynamics of the metal sub-sector, and complementing the other methods.

Manual content analysis will be used for grouping and analysing data gathered from the scoping exercise and in-depth studies. The Statistical Package for Social Sciences (SPSS) programme will be used for analysing the structured questionnaires. Using this approach, basic frequencies will be run for all the information in the questionnaire, as a first stage. In the second stage, a differentiation of frequencies will be made between formal and informal firms well as between firm sizes, followed by further analysis using cross tabulations and comparisons of means.

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Appendix:

Table A-1: Percentage change in the Production of the Manufacturing Sector (1980-1998)

INDUSTRY	1979/1980	1980/1981	1981/1982	1982/1983	1983/1984	1984/1985	1985/1986	1986/1987	1987/1988	1988/1989	1989/1990	1990/1991	1991/1992	1992/1993	1993/1994	1994/1995	1995/1996	1996/1997	1997/1998
Meat & dairy products	-11.4	19.1	15.8	28.2	-15.2	19.3	9.7	9.0	10.9	2.4	6.0	10.6	24.8	1.96	9.19	29.0	20.5	0.2	16.8
Canned vegetable, fish oils & fats	10.7	6.1	7.0	20.8	4.6	16.2	17.1	17.5	-0.1	8.7	0.2	11.2	-6.7	[illegible]	28.6	6.00	1.2	11.0	4.9
Grain mill products	8.4	0.9	2.2	12.6	6.3	8.0	8.3	3.2	13.3	-2.9	1.4	0.1	-4.1	-9.20	32.10	8.5	1.2	4.1	5.0
Bakery products	9.6	10.6	2.4	9.7	-1.9	10.3	11.3	12.5	2.6	-0.1	1.9	5.1	0.5	3.29	5.71	9.0	20.7	10.3	8.1
Sugar and confectionery	13.5	1.2	0.2	4.7	21.6	-6.1	1.4	2.1	6.3	4.2	1.3	1.0	-7.1	1.33	20.91	25.[illegible]	0.5	1.9	10.8
Miscellaneous foods	-16.4	6.4	1.1	-5.2	4.0	12.8	18.3	2.2	18.5	0.4	0.5	0.5	3.9	7.04	2.68	2.[illegible]	10.6	5.9	2.1
Beverage & tobacco	2.7	5.4	-5.2	-0.8	5.0	7.3	14.8	17.1	3.9	1.1	1.2	-1.2	13.1	-0.47	-6.52	5.24	-1.1	2.1	0.3
Textiles	14.8	21.4	-14.6	9.6	13.5	4.6	7.0	1.2	2.4	1.5	2.6	-4.1	0.0	15.31	2.83	26.97	0.1	-4.8	-0.8
Clothing	6.8	18.4	2.5	4.7	9.2	-4.6	0.7	1.4	2.4	2.8	8.3	-6.7	-1.0	8.78	17.11	-16.80	2.3	-6.3	4.2
Leather products & footwear	-5.8	-5.6	-18.1	0.3	-12.7	-1.5	2.2	2.0	5.5	7.5	4.7	8.5	7.0	9.12	10.13	-12.12	1.8	10.5	6.1
Wood & cork products	2.8	0.0	18.5	16.9	-16.5	27.4	1.0	1.5	-2.5	2.7	3.0	4.1	1.2	-0.42	3.12	3.42	0.7	0.1	2.0
Furniture & fixtures	-6	3.3	2.9	5.4	4.0	1.6	1.5	1.1	-2.1	0.3	1.0	1.9	0.3	6.0	2.01	1.71	10.3	0.0	2.2
Paper & paper products	20.7	1.5	5.1	5.3	5.9	7.3	6.8	8.2	11.4	2.8	4.7	5.3	4.9	-19.96	-13.80	-1.67	19.3	2.3	[illegible]
Printing & publishing	11.8	-7.0	2.4	5.8	11.7	4.3	5.9	6.2	4.5	1.0	2.3	1.0	1.3	0.00	3.31	6.31	3.0	0.0	0.0
Industrial chemicals	8.6	11.4	0.5	9.6	11.5	2.7	1.9	2.1	7.1	8.8	6.6	10.7	0.5	4.56	-12.92	-1.81	1.1	2.9	7.2
Petroleum & other chemicals	8.3	3.8	8.8	4.9	24.6	5.0	8.5	8.8	13.0	15.5	15.6	11.6	-5.8	-2.6	-3.32	8.47	9.4	11.3	0.5
Rubber products	5.4	7.3	9.7	2.8	6.6	8.9	6.1	5.6	3.4	7.8	5.6	-1.1	-4.5	-1.27	-1.40	1.19	3.3	7.5	1.4
Plastic products	6	8.5	9.1	7.8	5.5	6.3	3.9	1.2	-4.5	8.0	3.8	15.3	9.1	10.35	1.5	6.08	4.8	28.5	19.2
Pottery & Glass products	17.3	-19.5	8.4	9.4	30.2	2.4	0.2	0.7	5.1	0.3	8.6	2.0	5.2	-0.08	7.67	8.60	14.0	-5.1	8.1
Non-metallic mineral products	7.7	1.2	8.1	2.0	-11.3	2.5	10.7	5.7	-1.4	4.5	13.6	2.0	17.9	-2.08	5.06	-0.99	3.7	5.1	-6.0
Metal products	-4.1	17.1	-15.5	9.2	-8.2	6.0	10.1	11.3	14.5	16.2	14.5	16.1	-9.5	0.25	11.29	0.88	14.7	2.2	-15.1
Non-electrical machinery	27.1	9.8	-4.7	2.4	3.0	6.3	8.0	8.0	8.4	-4.3	2.6	2.7	5.5	-0.10	6.01	22.11	19.2	22.1	2.3
Electrical machinery	3.3	-1.0	2.3	-1.1	6.5	5.0	5.4	3.3	12.4	2.4	-1.8	6	-3.2	-10.67	0.76	12.16	7.1	20.1	4.0
Transport equipment	2.5	0.7	5.2	16.8	-14.2	[illegible]	-12.0	-7.8	11.9	4.2	5.6	-1.7	8.8	-16.98	5.58	7.42	35.2	-16.7	27.2
Miscellaneous manufactures	10.2	2.4	-10.0	10.1	32.7	28.1	18.7	29.2	20.6	4.1	8.7	8.6	0.5	-0.02	0.00	6.64	5.1	16.3	5.7
Total manufacturing	4.6	5.0	1.7	4.5	4.1	4.6	5.9	5.7	6.0	5.9	5.3	3.8	1.2	1.82	1.92	3.90	3.7	1.9	1.4