Transformation of an Industrial Cluster: The Case of Metalworking in Nairobi

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Abbreviations and Acronyms

ILO	International Labour Organization
MSE(s)	Micro and Small Enterprise(s)
NGO(s)	Non-Governmental Organization(s)
OLS	Ordinary Least Squares(s)
SAP(s)	Structural Adjustment Program(s)
TIVET	Technical, Industrial, Vocational and Entrepreneurship Training
US	United States of America

Abstract

Industrial clusters have increasingly become the engine of growth in developing countries because of agglomeration economies. Motivated by success in East Asia, Kenya's industrialization initiatives now hinge on the promotion of industrial clusters. This paper explores the growth prospects of garage mechanics and metalworking enterprises by rigorously analyzing primary data on enterprise in one of the largest industrial clusters in Nairobi. It is evident that while the industry is generally growing in terms of the number of workers and value added, some of the enterprises are undergoing transformation from being informal to formal. Although their products are generally crude, they now find it profitable to improve product quality. Quality improvement is undertaken by entrepreneurs who are highly educated, have experience from the formal sector, have received technical training, have taken more business trips, and those taking advantage of the cluster's tradition of the division of labor.

1. Introduction

Since the International Labour Organisation (ILO) Report on *Employment, Incomes and Equality* (ILO, 1972) that identified the potential of the informal or micro and small enterprise (MSE) sector in income and employment generation, the development of the sector has continued attracting attention from governments, private voluntary organizations, the donor community and researchers (Schmitz, 1982; Mead, 1994). However, MSEs in Africa tend to be viewed as static, stagnant, or declining because of lack of appropriate technologies, marketing, and management. The motivation of this paper, therefore, is to examine this issue more critically by providing new insights into the growth performance of MSEs with particular reference to the metalwork cluster in Nairobi.

More recently, however, there has been renewed interest in the development of the MSE sector, partly because the formal sector has not been able to generate increased employment opportunities to absorb the ever-increasing inflow of labour force from poor rural areas into the urban areas, and partly because pro-poor industrial development is necessary to eradicate widespread and chronic poverty.

Indeed the public sector and the large private enterprise sector have been going through retrenchment in various parts of sub-Saharan Africa.

The retrenchment dates from the implementation of the Structural Adjustment Programs (SAPs) in the late 1980s. It is also true that the majority of MSEs lack appropriate technologies, marketing, and management. Thus, the stagnancy or decline of the large enterprise sector may appear to be equal to that of the industrial sector of the economy.

Before equating them, however, one should answer a simple empirical question as to what the skilled employees who left large factories have been doing. It is believed that these former employees of the formal sector went to the informal sector and that many of them started some income-generating activities, which resulted in the proliferation of MSEs in urban areas. Have their skills and expertise been used efficiently to generate reasonable incomes for themselves and create jobs for the poor? Or have they been to a large degree wasted in the informal sector? Is there evidence that some of the clustered MSEs have become successful to the extent of getting transformed from informal to formal status? Of policy concern arising from this, therefore, is what can be done to hasten enterprise transformation, if any? These questions have policy implications, but they have seldom been addressed.

Broadly, the paper seeks to establish whether or not there is evidence of success among MSEs in terms of enterprise graduation or transformation from informal to formal status. More specifically, the paper wishes to find out whether there is evidence of quality improvement among MSEs, what factors explain such improvement and enterprise transformation behaviour, as well as their performance in terms of current size and employment growth. Enterprise transformation, in this context, refers to enterprise graduation from informal to formal status by moving from an "informal environment" to a "formal one" after successfully undergoing growth in employment and value added.

This paper seeks to address these objectives based on the case study of the metal products industry in the MSE sector at Kariobangi in Nairobi, Kenya. In the 1980s, a northern part of Kariobangi was designated by the local government to serve as a light industrial area for the *Jua Kali* enterprises, where "Jua Kali" in Swahili means hot sun and refers to "the informal sector artisans, such as car mechanics and metalworkers who were particularly noticeable for working under the hot sun" (King, 1996). While the Industrial Area in Nairobi had been established earlier to cater for the formal or modern large-scale enterprises, there were no areas for *Jua Kali* before Kariobangi. Garage mechanics were among the first to establish enterprises at Kariobangi. Welders followed and

thereafter metalwork producers and hardware shops began to be established. They cleared bushes to build roads and buildings in the area as the local government did not provide infrastructure. The strong backward linkage with mechanics attracted more garages to be established, which in turn attracted metalwork producers, including metal casting. Several years later, the cluster began to house residential apartments, which made it difficult for workshops to expand, while causing a health hazard to the residents.

Kariobangi is one of the many clusters consisting of garage mechanics and manufacturers of metal products in Africa. This paper reports the three recent developments in this cluster, which refute the conventional view on MSEs in Africa. The first is that about half of the entrepreneurs operating in the cluster came from the public sector or the large private enterprise sector and are now earning much higher incomes than when they worked in such formal enterprises and are creating jobs for less educated workers. Secondly, many enterprises in the cluster, especially those operated by highly educated and experienced entrepreneurs, are improving the quality of their products and also seeking new marketing channels suitable for their improved products. In this sense, there is productivity growth or qualitative change in this informal-sector cluster. Thirdly and moreover, most of the early starters of these improvements succeeded in fast growth and began to move out of Kariobangi to the formal industrial areas in Baba Dogo and Mukuru Kwa Njenga where large-scale enterprises are accommodated. Thus, MSEs in Kariobangi have sources of knowledge on decent technologies and management, are experiencing quality improvement and enterprise size growth, and transformation from an informal to formal sector.

The rest of the paper is organized as follows. Section 2 reviews available secondary data on the formal metalwork industry in Kenya. Section 3 describes the method of data collection and characterizes the enterprises and entrepreneurs using descriptive statistics. Section 4 conducts regressions to analyze the determinants of enterprise behaviors and performances. Section 5 contains the concluding remarks.

2. Overview of the Formal Metal Products Industry

Before analyzing the primary data, let us see the secondary data on the metal products industry in Kenya. The data shown in Figures 1 and 2, taken from *Statistical Abstracts* (Republic of Kenya, various), is on the

formal sector of this industry. Figure 1 shows the trend in employment in the formal metal products industry from 1975 to 2004. According to this figure, employment increased rapidly in this industry in the late 1980s but has been stagnant since the late 1990s. Figure 2 shows that the real output of this sector has been low after a peak in 1997. The recent stagnancy in employment and real output may be attributed to many possible factors. One is the rapidly increasing international price of scrap metal. Because of the fast growing and large economies, especially those in East and South Asia, the international market for the scrap metal has been tight, and accordingly the prices of almost all kinds of metal, scrap or new, have been increasing. The hike in raw material prices affected both formal and informal industries of metal products and in fact, during the data collection, many respondents complained of the increasing difficulty in obtaining raw materials. In assessing the damage, however, it should also be noted that the prices of metal products have also been increased.

Figure1: Employment in the Metal Products Industry
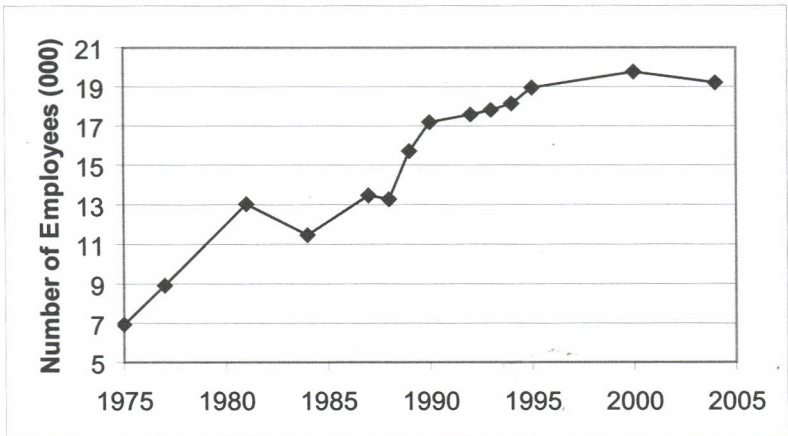
Source: Statistical Abstracts (various issues).

Figure 2: Real Output in the Metal Products Industry
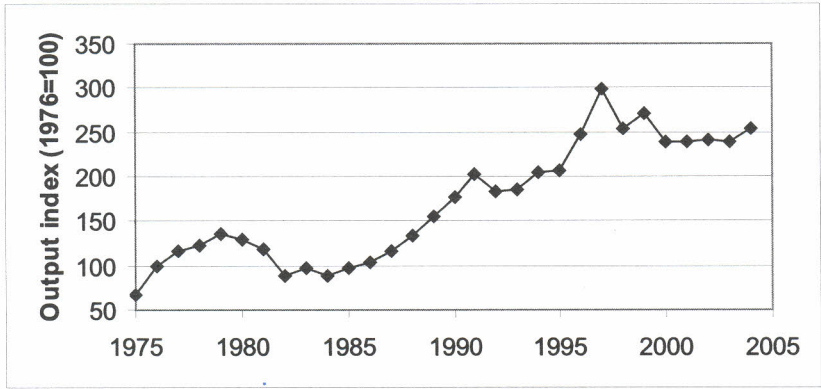
Source: Statistical Abstracts (various issues).

Another possible reason why the formal metal products industry has stagnated is that they created competition in the labor market. We conducted interviews with the managers of some large factories of metal products to obtain background information on the industry. They complained about low employee morale and frequent incidence of job separation or turnover, despite the high wage and salaries they pay their employees. According to these managers, some of these job leavers started their own businesses in some clusters of informal-sector enterprises. The large factories had provided their employees with on-the-job training and seminars for skill formation, which increased their ability to operate own workshops. Moreover, as clusters of MSEs are formed and expanded, the division of labor among MSEs might develop, as Marshall (1920) observed, and this would reduce the required initial investment and the required skill for new entry because new entrants could specialize in particular production processes, as Schmitz and Nadvi (1999), Sonobe et al. (2003), and many others maintain. These developments would increase the outside opportunities for the employees working in the large factory sector, which would reduce employee morale and accordingly productive efficiency of the sector, according to the efficiency wage theory (e.g., Shapiro and Stiglitz, 1984).

3. Data

3.1 Data Collection

In Kariobangi, no census of the enterprises has been carried out in the past. The Kariobangi *Jua Kali* Association, however, estimates the number of the enterprises to be around 300 as of 2006. This number includes restaurants and other enterprises in the food sector, carpenters manufacturing pool tables, and enterprises engaging in the recycling of metal and plastic materials. Since the core activities in the cluster were said to be metalwork and related activities such as vehicle repair, information was gathered from all the enterprises engaged in metalwork and related activities in the cluster. The association was requested to list their names and locate them on a map of the cluster. The 140 enterprises that the association identified, were visited in August and September 2006, and reliable data on production and costs, marketing, the backgrounds of entrepreneurs from 121 enterprises was obtained using a questionnaire prepared on the basis of reconnaissance surveys carried out in 2005 and early 2006.

During the reconnaissance surveys, we noticed that some enterprises had moved early in the year or in the previous years to the Baba Dogo and Mukuru Kwa Njenga Industrial Areas. The major motivation of enterprise relocation turned out to be twofold. Firstly, those enterprises, which began expanding production, could not find space for further expansion in the Kariobangi Light Industry. This cluster was fully occupied by workshops and residential buildings, whereas the Baba Dogo and Mukuru Kwa Njenga Industrial Areas still had ample space. Although Kariobangi was initially designated as an 'Industrial Area' for *Jua Kali*, it has over time been converted into an industrial-cum residential area, that has left residents complaining of air and noise pollution from the workshops. Secondly, Kariobangi is synonymous with poor quality products and insecurity and therefore it was important for such growing enterprises to move out in order to gain confidence of current and potential customers. To examine the performances of these 'graduates' from the Kariobangi Light Industry and their characteristics, we asked our respondents in Kariobangi whether any of their acquaintances left the area for the Industrial Areas and, if any, we asked about their whereabouts. We found that there were eight such graduates and we visited and obtained data from seven of them. Thus, in total, data was collected from 128 enterprises.

The type of activities of the sample enterprises is distributed as follows: metalwork enterprises account for 70 percent, garages 11 percent,

hardware shops 13 percent, and metal casting enterprises 6 percent. Metalwork enterprises manufacture metal furniture and fixtures, simple auto parts, construction materials such as window frames, metal gates, padlock, bolts and nuts, and hinges, and simple machines such as animal feed mixtures and flour mill machines. Some of the garages are well equipped with boring and grinding machines, not just ordinary lathe and milling machines, so that they can overhaul engines and crankshafts. Metal casting enterprises cast non-ferrous metal such as aluminium and brass to make a variety of small products, ranging from machine parts to consumer goods. Hardware shops deal in steel sheets and wires transported from Mombasa and other cities.

3.2 Characteristics of Entrepreneurs

In Table 1 and the subsequent tables, the enterprises are classified into three groups. The first group consists of seven enterprises and is termed "Moved" because the enterprises in this group moved from Kariobangi to the Baba Dogo and Mukuru Kwa Njenga Industrial Areas. The owner-managers (we refer to owner-managers as entrepreneurs henceforth) of all these seven enterprises used to work in the formal manufacturing sector, where they gained experience and technology and management skills for 8.7 years on average. Then they founded enterprises in Kariobangi around 1996 on average and then left recently between 2004 and 2005. The second group consists of 65 enterprises and is termed "Large" because the entrepreneurs came from large companies in the formal sector, even though the average years of their experience in the formal sector is just 3.5 years, much shorter than that of the Moved.[1] At the time of the study, these enterprises were still operating in Kariobangi but some of them were preparing to move to Industrial Area as well. The third group is the rest of the sample. Enterprises in this group do not have experience in the formal sector but were engaged in similar business in the informal sector, mostly in Kariobangi, for 3.3 years on average.

The Moved and the Large differ significantly in the average years of prior experience, whereas the Large and the Rest do not differ much in this respect, as shown in the last two columns. Later, we will run regressions of enterprise performance indicators on characteristics of entrepreneurs and enterprises to examine whether or not their longer period of learning in the formal sector is responsible for the fact that the

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[1] Interestingly, none of the enterprises were in the Moved and Large categories at the same time.

Table 1: Characteristics of Entrepreneurs by Enterprise Type

	Moved A	Large B	Rest C	t for A - B	t for B - C
No. of enterprises in 2005	7	65	56		
Prior experience (years)	8.7	3.5	3.3	2.13**	0.25
Manager's age (years)	45.6	42.1	37.9	1.47*	2.61***
Education (years)	15.3	13.0	10.8	2.06**	3.25***
Technical training (%)	86	60	13	1.95**	5.65***
Number of business trips	2.0	1.1	0.4	1.24	1.30*

Note: Moved = firms that moved from Kariobangi to Industrial Area. Large = firms Whose managers originated from large companies in the formal sector. Rest = the rest of the firms excluding Large and Moved. ***, **, and * denote significant at 1, 5, and 10% levels, respectively. The numbers in the last two columns are absolute t-statistics.

Source: Survey data.

Moved successfully grew large and graduated from Kariobangi. Regression analysis is necessary to isolate the effect of experience in the formal sector on enterprise performance because the three types of enterprises differ significantly in other characteristics as well. They differ significantly in the age of entrepreneur, for example. While most of the entrepreneurs of the Moved had tertiary education, the majority of the Large had secondary education and the Rest had secondary or less education only. While all but one entrepreneurs of the Moved had received formal technical training in areas such as mechanical engineering at universities, polytechnics or middle-level colleges, as compared with 60 percent of the Large, only 13 percent of the Rest had such training.

The Moved had, on average, made two business trips abroad in the past, while the Large had one trip. The highest number of business trips abroad made was 15. The most common destinations were Uganda and Tanzania, but a small number of entrepreneurs have been to Congo, Ethiopia, Zambia, South Africa, and Malawi. A few others have been to as far as United Arab Emirates, India, Singapore, and China. The major purposes of the visits are to explore opportunities for new markets for products that are locally manufactured and to seek information on more efficient technologies. Thus, business trips abroad help them perform better. At the same time, business trips abroad are the result of their high performances, because financial constraints prevented the vast majority of the Rest entrepreneurs from undertaking any trips.

3.3 Enterprise Size

Table 2 shows the average years of operation and the average enterprise size in terms of the number of workers and value added by enterprise type. As shown in Table 1, while the Moved entrepreneurs tend to be older than the Large entrepreneurs, the former tend to have studied longer and worked longer before they started their own businesses. As a result, the two groups of enterprises share the same average years of operation as shown in Table 2. The Rest enterprises are relatively new. Of the whole sample of 128 enterprises, 69 enterprises were established before or in 1998 and 59 enterprises were established between 1999 and 2005. These 59 new comers are included in the Large and the Rest but not in the Moved. The average enterprise size of the Moved was already twice as large as that of the Large, whether the size is measured in the number of workers or value added. The difference in size between the Large and the Rest is small, especially if it is measured in the number of workers. Because we could not find any appropriate deflator to convert nominal values in Kenyan Shillings into real values, value added is shown in terms of US dollars. While it is nominal, strictly speaking, we believe it is reasonably akin to real output.

Table 2: Years of Operation and Enterprise Size by Enterprise Type

		Moved A	Large B	Rest C	t for A - B	t for B - C
Years of operation		9.3	9.3	7.7	0.00	1.33*
Number of workers	1998	13.8	6.1	5.4	5.43***	0.65
	2005	21.7	7.5	5.5	10.78***	1.35*
Value Added (US$'000)						
	1998	86.5	28.5	19.2	3.63***	1.97**
	2005	130.9	36.8	24.0	11.94***	1.16

Note: ***, **, and * denote significant at 1, 5, and 10% levels, respectively. The numbers in the last two columns are absolute t-statistics.

Source: Survey data.

As shown in Table 2, the employment size of the Large is small compared with that of the Moved, but it is larger than that of the Rest and the difference is significant at the 10 percent level. Thus, the entrepreneurs' experience in the formal sector may contribute to job creation in the informal sector. Interviews with these entrepreneurs of the Large enterprises revealed that they were better off as *Jua Kali* in Kariobangi

than as employees in the formal sector. They had received US$ 140 per month, on average, as their wage in the formal sector. Their monthly gross profit in Kariobangi was US$ 1,958 in 1998 on average, where gross profit means sales minus current costs such as of materials and electricity and payments to sub-contractors and workers. The direct comparison is difficult because the two numbers came from different timings and their incomes should be smaller than their gross profits. The large difference between the two, however, is consistent with what we heard from our respondents.

One of our basic assumptions is that the enterprises have upward-sloping marginal cost curves and that their relative sizes reflect the relative location of their marginal cost curves, which in turn reflect the production and management efficiency of the enterprises. This assumption has been commonly employed in the empirical analyses to interpret the observations of the enterprise size distribution and productivity growth in manufacturing industries (e.g., Baily, Hulten, and Campbell, 1992; Griliches and Regev, 1995). We see from Table 2 that the Moved enterprises have the largest enterprise sizes, followed by the Large and then by the Rest, but we also see from Table 1 that the entrepreneurs of the Moved enterprises tend to have high education levels, formal technical training, and more experience in the formal sector and that they are followed by the Large and then by the Rest. The three types of the enterprises are ranked in the same order, which suggests that the human capital of the entrepreneur is a major determinant of the production and management efficiency of the enterprise.

As Marshall (1920) points out, industrial clusters are favorable locations for enterprises because of the benefits of localization economies, such as information spillovers, the developed division and specialization of labor among enterprises due to low transaction costs in the cluster, and the development of labor market for special skills. Thus, an industrial cluster attracts a massive entry of new enterprises that produce the same low-quality products using the same production technique as the incumbent enterprises. Since the market for such a low-quality product is small and easily saturated by the increased supply due to the new entry, the profitability of producing such a product will decline sooner or later. According to recent studies of cluster-based development (e.g., Schmitz and Nadvi, 1999; Schmitz, 2004; Sonobe and Otsuka, 2006), some enterprises in the cluster attempt to begin the improvement of product quality. The case studies of this phase of industrial development conducted in eight industries in East Asia (Sonobe and Otsuka, 2006) and in the

footwear industry in Ethiopia (Sonobe, Akoten, and Otsuka, 2006) commonly find that the education level of entrepreneurs assumes importance in determining enterprise performance only after the industry reaches this phase. This common finding of the existing case studies, together with our observation from Tables 1 and 2, suggests that Kariobangi is entering the quality improvement phase where entrepreneurs' human capital accumulated through schooling and formal training plays an important role.

While the education level and occupational background of each entrepreneur do not vary over time, the difference in enterprise size between the Moved and the Large and between the Moved and the Rest was widened over time between 1998 and 2005, not only in absolute terms but also in proportion. This is not inconsistent with our conjecture as to the link between enterprise size and the human capital of entrepreneur. The increase in the difference in size may be attributed to two factors. Firstly, in 2005, whereas the Moved are all incumbents, the Large and the Rest include new comers, which tend to be smaller than the incumbents. Secondly and more importantly, the enterprise sizes of the Moved were bound by the limited floor spaces available in Kariobangi in 1998, but upon moving to the Industrial Area, they could rapidly expand their operation sizes. Moreover, they could more easily attract customers to their new locations than at Kariobangi because of the better road condition and that potential customers tend to have a better image of enterprises in the formal industrial areas.

3.4 Marketing Channels

Because the enterprises in our data set produce a variety of products and services, it is practically impossible to measure product quality. However, data was obtained on marketing channels, which we believe to be closely related to product quality for two reasons. Firstly, respondents in Kariobangi said as follows: while rough products produced by mediocre enterprises in the cluster are sold to individuals who visit the cluster, high-quality products with high durability and beautiful finishing are sold at much higher prices to the government, non-government organizations, large companies, or buyers in foreign countries. The respondents also said that products with medium quality are sold to wholesalers.

Secondly, the existing literature reports similar correlation between the ladder of quality levels of products and that of types of major customer. For producers of low-end-quality garments in Nairobi, it is more profitable to work for traders who buy products in bulk at stable prices than working for individual consumers like tailors, but it requires assuring traders of the ability to produce relatively high-quality products in large quantity (Akoten and Otsuka, 2006). In garment industries in rural towns in China and Japan, as producers improve quality and acquire large production capacity, they shift major marketing channels from transactions with local traders to direct transactions with large retailers, such as department stores and supermarkets in large cities (Sonobe, Hu, and Otsuka, 2002; Yamamura, Sonobe, and Otsuka, 2003). In the electric appliance industry in Wenzhou, innovative enterprises reduced sales to traders, who might mingle high- and low-quality products together, and increased sales through own distribution network consisting of own retail shops and sales agencies (Sonobe, Hu, and Otsuka, 2004). Moreover, they expanded sales volume under their brand names quickly and drastically by merging a large number of small producers in order to exploit the size effect arising from the positive feedback between sales volume and the publicity of their brand names. In the shoe industry in Addis Ababa where more than a thousand workshops produce leather shoes, high-quality shoemakers established brand names and developed own distribution network within the country and have recently begun finding their way into European markets (Sonobe, Akoten, and Otsuka, 2006). Thus, these case studies reveal that quality improvement means to climb the two ladders of product quality and marketing channels.

Table 3 classifies the marketing channels for the enterprises in Kariobangi into four categories: (1) Sales to individuals who visit the enterprise; (2) Sales to manufacturers or assemblers who purchase the parts to make the final product; (3) Wholesalers who purchase products in bulk; and (4) Direct marketing, which consists of sales made through own retail shops, special orders received from the government and non-governmental organizations, and exports to foreign countries. Some enterprises sell their products to NGOs who in turn export them to foreign countries such as Malawi, Mozambique, and Cote d'Ivoire. Others export them directly to foreign countries. All the export destinations turned out to be within Africa. The numbers shown in the table are percentage shares of respective marketing channels.

Table 3: Percentage Shares of Sales Revenues to or Through Different Marketing Channels by Enterprise Type (1998 and 2005)

Marketing Channel	Moved	Large	Rest
In 1998			
Individuals	47.5	42.5	41.5
Manufacturers	0.0	21.9	28.3
Wholesalers	7.5	20.8	18.2
Direct Marketing	45.0	14.7	11.7
Own shop	*0.0*	*1.4*	*0.5*
Special orders	*40.0*	*10.3*	*8.5*
Export	*5.0*	*3.0*	*2.7*
Total	**100**	**100**	**100**
In 2005			
Individuals	17.9	28.9	38.9
Manufacturers	14.3	18.3	28.5
Wholesalers	17.1	26.2	22.4
Direct Marketing	50.7	27.1	10.2
Own shop	*0.0*	*4.7*	*3.7*
Special orders	*39.3*	*17.2*	*6.5*
Export	*11.4*	*5.2*	*0.0*
Total	**100**	**100**	**100**

Source: Survey data.

The main marketing channel in 1998 seems to be individuals who account for about 40 percent or more of sales for each enterprise type. Sales through manufacturers was nil for Moved but over 20 percent of the total sales for Large and Rest. Sales through wholesalers registered about 8 percent for Moved and over 18 percent for Large and Rest. Direct marketing accounted for 45 percent for Moved, about 12 percent for Rest and 15 percent for Large. For firms that moved, sales to individuals and direct marketing appeared to be the most important marketing channels. While the importance of individuals has been declining over time, that of wholesalers and direct marketing has been gaining. Sales to wholesalers accounted for 7.5 percent in 1998, which more than doubled in 2005. That of Large increased slightly from 21 to 26 percent, and that of Rest from 18 percent to 22 percent over the two periods, respectively. Sales through direct marketing for Moved accounted for 45 percent of total sales in 1998, rising to 50.7 percent in 2005. That of Large rose

from about 15 percent to 27 percent, while that of Rest declined from 12 percent to about 10 percent. None of the firms that moved sold any parts to manufacturers, neither did they rely on wholesalers to a large extent. In short, the Large enterprises have higher shares of wholesalers and direct marketing than the Rest, and the Moved have even higher shares of direct marketing. These observations are consistent with the images generally held by our respondents about the Moved and the Large; that is, the Moved are producers of high-quality products, and the Large tend to produce better products than the Rest.

It is worth noting, however, that there are exceptions. For example, Muharata, a producer of agricultural machinery, is classified as Large, but it is known for its high-quality machines and has successfully established its brand name in Kenya and the neighboring countries. It does not depend on wholesalers but uses newspaper advertisement and own distribution network for marketing. It has been performing well in terms of sales growth and profits. Since its workshop and display shop are spacious and on the main street, it has not felt the need to move to the Industrial Area. Thus, the Large are not necessarily inferior to the Moved. Instead, the point we would like to make is that the quality of products and the marketing channels are correlated. Probably, this correlation arises from the fact that the production of a higher-quality product is profitable only when the producer succeeds in convincing buyers of the high quality, because quality improvement creates the problem of asymmetric information between the producer and the buyers.

In addition to the correlation between the quality of products and marketing channels, the existing case studies suggest that the degree of vertical integration of production processes is also correlated with product quality (e.g., Sonobe, Kawakami, and Otsuka, 2003; Yamamura, Sonobe, and Otsuka, 2005). The production of higher-quality and differentiated products requires higher-quality and specially designed parts, which are not available in the market. When product quality is improved, therefore, arm's length market transactions of parts become disadvantageous relative to long-term sub-contracting and vertically integrated production systems in terms of transaction costs. Thus, the improvement of product quality is complementary with improvements in marketing methods and production organization, and, hence, it is profitable when these improvements are carried out simultaneously. Probably this is the reason why the existing case studies observed such multifaceted improvements or innovations

rather than quality improvement alone. Probably it is also the reason why quality improvement tended to be led by highly educated and formally trained entrepreneurs in the successful industries in East Asia (Sonobe and Otsuka, 2006). Observations from Tables 1, 2, and 3 suggest that similar quality improvement is being carried out by informal-sector enterprises in Kariobangi and the graduates from this cluster.

4. Regression Analyses

4.1 Testable Hypotheses

We have so far made four major observations. Firstly, former employees of the formal sector started their own businesses in an industrial cluster in the informal sector, creating jobs for uneducated workers. Secondly, some of the enterprises in the cluster were transformed into formal-sector enterprises. Thirdly, the enterprises staying in the cluster and those that moved to the formal sector have different marketing channels. Lastly, their marketing channels are associated with their enterprise sizes, and both are related to the educational and occupational backgrounds of the entrepreneurs. Based on these observations, together with the existing literature reviewed in the previous section, we would like to advance the following three hypotheses:

Hypothesis 1: Quality improvement, which is reflected in the proportion of sales revenues through direct marketing and to a lesser degree, the proportion of sales to wholesalers, is led by highly educated entrepreneurs with formal training and work experience in the formal sector.

Hypothesis 2: Because of quality improvement, the enterprises managed by more highly educated entrepreneurs with formal training and work experience in the formal sector have larger sizes in terms of employment and value added.

Hypothesis 3: Because the enterprises successful in quality improvement have grown larger, they are more likely to move out to more spacious locations in the Industrial Areas.

As stated in Hypotheses 1 and 2, we seek to identify the determinants of quality improvement as well as the determinants of current firm size in terms of the number of workers and value added.[2] Following Sonobe and Otsuka (2006), we estimate the following functions[3]:

$$M = \alpha_0 + \alpha_1 age + \alpha_2 firmage + \alpha_3 eduyrs + \alpha_4 techtrain +$$

$$\alpha_5 fmlexper + \alpha_6 subsector + \alpha_7 year + \varepsilon_1 \qquad (1)$$

where

M	=	A vector of variables, namely, the quality index of products and current firm size (in terms of the number of workers and value added).
Age	=	Age of the owner-manager or entrepreneur in years.
Firmage	=	Age of the enterprise in years.
Eduyrs	=	The number of years of formal schooling of the owner-manager.
Techtrain	=	The proportion of owner-managers who received formal technical training.
Fmlexper	=	The number of years that an owner-manager worked in large enterprises in the formal sector before leaving to start own enterprise.
Subsector	=	The sub-sector to which the owner-manager is engaged in. It takes the value one if the sub-sector is metalwork and zero if otherwise. The default sub-sectors are garages, hardware shops, and metal casting enterprises.
Year	=	A vector of year dummies. The default is year 2005.
a_s	=	The parameters to be estimated
e_1	=	The disturbance term.

A good proxy for quality index in the context of Kariobangi metalworking enterprises is the fractions of sales revenues through direct marketing and sales to wholesalers. Since the dependent variable that proxies for quality index is censored at 0 from below and at 1 from above, we use

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[2] Among MSEs, the owner of the enterprise is both a manager as well as a worker because he/she often participates in the production process in order to control the quality of the product or service. Therefore, the number of workers includes the owner-manager or entrepreneur.

[3] We take natural logarithms of continuous variables.

the Tobit model for estimation of equation (1). As suggested in Hypothesis 1 that entrepreneurs who engage in quality improvement are those with many years of education, formal training and many years of prior work experience in the formal sector, it is expected that *eduyrs, techtrain* and *fmlexper* will be statistically significant, while their coefficients will be positive.

Firms that improve the quality of their products or services are expected to grow in terms of employment and value added. Given that employment and value added are continuous variables, we use OLS regressions technique to obtain estimates of the determinants of current firm size as shown in equation (1). From Hypothesis 2, we expect that *eduyrs, techtrain* and *fmlexper* will be statistically significant, while their coefficients will be positive.

The overall hypothesis of this paper is that successful enterprises are those that grow faster in terms of employment. Since the interval between the current and previous years of observation is two or three years, we use annual growth rate, or the log of current size minus the log of previous size divided by the number of years, as the dependent variable. Enterprises that are successful by growing faster are those that are operated by entrepreneurs with technical training skills and many years of education and work experience in the formal sector. Successful enterprises are likely to graduate and become formal as well. In other words, they undergo transformation from informal to formal status. As discussed earlier, because of congestion at Kariobangi, enterprises that are doing well tend to move to the Industrial Areas where infrastructure facilities are better. Thus, a firm is deemed to have transformed or graduated if it moved to the Industrial Areas. In order to identify the determinants of enterprise growth and transformation, we estimate the following functions:

$$Z = \beta_0 + \beta_1 isize + \beta_2 age + \beta_3 firmage + \beta_4 eduyrs +$$
$$\beta_5 techtrain + \beta_6 fmlexper + \beta_7 subsector + \beta_8 year + \varepsilon_2 \quad (2)$$

where

Z = A vector of variables, viz., employment growth and a dummy that indicates whether or not an enterprise underwent transformation (or graduation) from informal to formal status.

$isize$ = The initial size of the enterprise.

$b_s =$ The parameters to be estimated.
$e_2 =$ The disturbance term.

The rest of the variables are the same as those in equation (1).

We use OLS to estimate the determinants of enterprise growth and Probit model to explain the likelihood of an enterprise moving to the Industrial Areas using the same set of exogenous variables. It is expected that *eduyrs, techtrain* and *fmlexper* will be statistically significant, while their coefficients will be positive in both functions in equation (2), and thus supporting Hypotheses 2 and 3.

As a priori, *age* and *firmage* are likely to have positive effects in both equations (1) and (2) because, while the former proxies for general experience and the latter is a proxy for management experience, they both enhance enterprise performance. The coefficient of the year dummies may be positive or negative in equation (1) but negative in equation (2) if firm size has been increasing over time. The *subsector* dummy may have positive or negative coefficient depending on how the sub-sector responded well in terms of performance.

4.2 Regression Results

Tables 4 though 7 present the results of the estimations, with the numbers in parentheses showing t-(z-) statistics. We interpret the results sequentially and determine whether or not they are consistent with the hypotheses advanced in the previous section.

Determinants of Sales Shares by Marketing Channel
Table 4 shows the results of estimating the functions explaining sales shares to four marketing channels, namely sales to individuals, manufacturers, wholesalers, and sales through direct marketing. We compare the results for each marketing channel while controlling or not controlling for social capital, as represented by the number of relatives in the same line of business. The importance of social capital may be important when the quality of a product increases so that an entrepreneur may seek important customers such as NGOs through social connections or networks.[4]

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[4] The year dummies are insignificant and are not shown in the table in order to save on space and to prevent the table from spilling over to the next page.

Table 4: Estimated Functions Explaining Sales Shares by Marketing Channel (Tobit)

Variable	Shares of sales to/through							
	Individuals		Manufacturers		Wholesalers		Direct Marketing	
	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ln(manager's age, years)	6.84	4.31	16.23	16.31	-39.50	-38.24	-33.91	-19.63
	(0.33)	(0.21)	(0.59)	(0.59)	(1.50)	(1.49)	(1.30)	(0.71)
Ln(firm age, years)	10.81	9.24	-4.80	-5.14	-2.68	-2.01	12.54	11.55
	(1.62)	(1.36)	(0.53)	(0.57)	(0.32)	(0.24)	(1.39)	(1.25)
Ln(education, years)	-76.00***	-67.17***	-37.33**	-35.77*	83.66***	79.79***	131.22***	110.05***
	(4.81)	(4.29)	(2.32)	(1.75)	(4.03)	(3.88)	(5.57)	(4.74)
If received technical training	33.53***	33.94***	-2.73	-2.11	55.06***	55.76***	34.52***	32.48***
	(3.76)	(3.71)	(0.23)	(0.18)	(4.66)	(4.70)	(3.14)	(2.80)
Formal sector experience (years)	-0.49***	-1.82*	-3.57**	-3.88**	2.53**	2.94***	0.80**	1.69
	(0.49)	(1.90)	(2.27)	(2.54)	(2.10)	(2.51)	(2.15)	(1.50)
Number of relatives in same line of business	-5.86***		-2.62		2.46		8.79***	
	(3.60)		(0.91)		(1.28)		(5.15)	
If metalwork	-6.77	-11.36	-33.74***	-35.18***	47.39***	50.18***	2.94	7.42
	(0.81)	(1.34)	(3.06)	(3.21)	(4.03)	(4.30)	(0.29)	(0.69)
Constant	175.45**	164.70**	55.79	50.74	-99.19	-91.55	-266.32***	-268.86**
	(2.22)	(2.04)	(0.52)	(0.47)	(1.01)	(0.92)	(2.67)	(2.52)
LR chi^2	42.76***	29.64***	29.89***	28.98***	54.48***	52.88***	66.03***	33.15***
Pseudo R^2	0.02	0.01	0.02	0.02	0.03	0.03	0.05	0.03
Log likelihood	-1228.57	-1235.13	-860.38	-860.83	-804.91	-801.57	-607.82	-622.27
Number of observations	369	369	368	368	367	367	369	369
Left-censored at <=0	93	93	220	220	233	233	277	277
Uncensored	189	189	121	121	115	115	90	90
Right-censored at >=100	87	87	27	27	19	19	2	2

Note: ***, **, and * denote significant at 1, 5, and 10% levels, respectively. Numbers in parentheses are absolute z-statistics.

As discussed earlier, the major type of marketing strategies that a producer relies on is largely influenced by the quality of the product or service being manufactured or offered. According to column (1) of Table 4, entrepreneurs with fewer years of education and formal sector experience, and those with narrow social networks, including those with technical training skills tend to rely on individuals as a form of marketing channel. Qualitatively, the impacts of these variables are the same when we do not control for social capital in column (2). The results in columns (3) and (4) suggest that entrepreneurs who sell to manufacturers are less educated, less experienced in the formal sector, and those operating enterprises involved in other activities other than metalwork. The impact of social networks on sales is unimportant.

Columns (5) and (6) report the results for sales to wholesalers. The results indicate that wholesaler-dependant owner-managers are more educated, have formal technical training skills, and have many years of formal sector experience. Like in the case of sales to manufacturers, social networks do not matter for sales to wholesalers. Finally, columns (7) and (8) show the determinants of sales through direct marketing. The results suggest that entrepreneurs who use direct marketing channels have many years of education and formal sector experience and formal technical training skills as well as stronger social capital. However, formal sector experience becomes insignificant when social capital is not controlled for. These results are supportive of Hypothesis 1 that highly educated entrepreneurs with formal technical training skills and those with many years of formal sector experience tend to rely on direct marketing and to some extent wholesalers as key marketing channels.

To sum up, entrepreneurs who are highly educated with many years of formal sector experience are more likely to sell their products through direct marketing and to a smaller extent to wholesalers rather than to individuals. Given that product quality and marketing channel are positively correlated, entrepreneurs with high levels of human capital skills find it profitable to rely on direct marketing to sell high quality products.

Determinants of Current Size
Table 5 shows the determinants of current size as measured by the number of workers and value added by year. The results of pooled data are presented in columns (1) and (3) of Table 6.

According to Table 5, the age of an entrepreneur and years of education are the only two important determinants of current employment size in

Table 5: Determinants of Current Employment and Value Added by Year (OLS)

Variable	InL				InVA			
	1998	2000	2002	2005	1998	2000	2002	2005
	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ln(manager's age, yrs)	1.12**	0.80*	0.48	0.06	0.08	-0.62	0.46	0.20
	(2.33)	(1.91)	(1.58)	(0.19)	(0.19)	(0.64)	(0.64)	(0.33)
Ln(firm age, years)	0.34	0.59***	0.48***	0.34***	0.17	0.21	0.23	0.37**
	(1.47)	(3.04)	(4.23)	(3.90)	(0.37)	(0.48)	(0.85)	(2.23)
Ln(education, yrs)	0.55*	0.41	0.49**	0.64***	0.88*	1.16*	0.65	1.22***
	(1.83)	(1.45)	(2.17)	(2.64)	(1.66)	(1.85)	(1.20)	(2.64)
If received technical training	-0.06	-0.11	-0.14	0.04	-0.28	-0.09	-0.24	0.01
	(0.31)	(0.69)	(1.03)	(0.25)	(0.81)	(0.25)	(0.77)	(0.04)
Formal sector experience (years)	0.02	0.04**	0.04**	0.02*	0.06*	0.08**	0.08**	0.03
	(1.31)	(2.32)	(2.52)	(1.69)	(1.76)	(2.00)	(2.00)	(0.97)
If metalwork	-0.16	-0.12	0.11	0.09	-0.01	0.09	0.49	0.50**
	(0.95)	(0.77)	(0.89)	(0.69)	(0.03)	(0.26)	(1.63)	(1.98)
Constant	-4.80***	-3.83**	-2.46**	-0.82	12.07***	13.08***	10.86***	11.90***
	(2.76)	(2.54)	(2.18)	(0.66)	(3.54)	(3.75)	(4.05)	(5.02)
F-stat	4.09***	6.45***	10.52***	6.20***	1.10	1.52	2.16*	3.25***
R-squared	0.30	0.36	0.39	0.25	0.10	0.12	0.12	0.15
Number of observations	65	77	106	121	65	77	106	121

Note: ***, **, and * denote significant at 1, 5, and 10% levels, respectively. Numbers in parentheses are absolute t-statistics.

1998. In 2000, entrepreneur's age, years of operation, and formal sector experience assume importance. In 2002 and 2005, years of operation, years of education, and formal sector experience are important factors that explain current employment size. In each of the years, having technical training skills or the sub-sector in which an entrepreneur operates does not matter in explaining current size. In terms of value added, years of education and years of formal sector experience are positive and significant in the equations for year 1998 and 2000. Formal sector experience is important in 2002, while years of operation, years of education and if the entrepreneur operates a metalwork enterprise are important determinants in 2005. Although a few variables are significant in each equation, these results suggest that education and formal sector experience are generally the most important determinants of current size in each year.

Table 6: Determinants of Level and Growth of Employment and Value Added

Variable	lnL		lnVA	
	Level (pooled) (1)	Growth rate (2)	Level (pooled) (3)	Growth rate (4)
LnL (VA) past		0.02***		-0.03***
		(3.16)		(5.82)
Ln(manager's age, years)	0.49***	0.02	0.10	0.04
	(2.75)	(1.23)	(0.28)	(1.16)
Ln(firm age, years)	0.34***	0.01	0.27**	0.01
	(5.77)	(1.04)	(2.20)	(0.91)
Ln(education, years)	0.56***	0.03*	1.00***	0.07***
	(4.28)	(1.87)	(3.69)	(2.59)
If received technical training	0.06*	-0.01	0.16*	0.01**
	(1.80)	(1.01)	(1.81)	(2.35)
Formal sector experience (years)	0.03***	0.001	0.05***	0.003**
	(3.87)	(1.30)	(3.18)	(2.02)
If metalwork	-0.11	-0.001	-0.29*	-0.003
	(1.51)	(0.20)	(1.95)	(0.25)
Year 2002	-0.12*	0.02*	-0.18	0.02
	(1.66)	(1.96)	(1.11)	(1.33)
Year 2000	-0.17**	0.01*	-0.24	0.04**
	(2.01)	(1.68)	(1.36)	(2.18)
Constant	-2.28***	-0.10	12.04***	-0.46***
	(3.34)	(1.36)	(8.49)	(3.25)
F-stat	16.74***	4.34***	4.91***	6.01***
R-squared	0.27	0.14	0.10	0.19
Number of observations	369	245	369	245

Note: ***, **, and * denote significant at 1, 5, and 10% levels, respectively. Numbers in parentheses are absolute t-statistics.

When pooled data is considered, the age of the manager, years of operation, educational level, and formal sector experience increase with current employment, as shown in column (1) of Table 6. The results also indicate that the size effect for year 2000 and 2002 are smaller than that of year 2005, indicating that enterprises have been growing over time. In terms of value added, years of operation, years of education, technical training skills, and formal sector experience increase with current size. However, metalwork enterprises seem to have lower value added than enterprises in the other sub-sectors such as garages. The fact that education, technical training skills and formal sector experience increase with current size supports Hypothesis 2.

Determinants of Firm Growth and Enterprise Transformation
Columns (2) and (4) in Table 6 show factors that explain enterprise growth in terms of the number of workers and value added. In terms of growth in workforce, initial employment is positively and significantly related with growth. This indicates that firms that were large in the past are likely to grow fast by 2 percent per year. This result is inconsistent with Gibrat's Law that initial firm size and growth are independently related (Eatwell, Milgate, and Newman, 1987). The other factor that explains growth in employment is education: its coefficient suggests that entrepreneurs whose years of education increase by 1 percent enjoy an increase in employment growth of 3 percent per year. The coefficients of the year dummies for 2000 and 2002 are positive and significant, suggesting that employment growth in 2000 and 2002 was higher in these years than in 2005.This, again, suggests that enterprises at Kariobangi were growing vertically over time at a rate of 1 percent per year in 2000, which accelerated to 2 percent per year in 2002. Other factors that were found to have no significant effect on growth in employment include the age of the entrepreneur, years of enterprise operation, a dummy if an entrepreneur undertook technical training, years of experience in the formal sector, and the sub-sector in which an entrepreneur works.

In column (4), which shows the determinants of value added growth, past size is inversely related to growth in value added. Its effect implies that a firm whose size in the past was smaller by 1 percent grows at a rate of 3 percent per year. The inverse relationship between past size and growth is consistent with the results found in earlier studies (e.g., Mead and Liedholm, 1998; Liedholm, 2001; Nurmi, 2004; van Biesebroeck, 2005). It suggests that smaller firms grow faster because of learning by doing effect, as explained in Jovanovic (1982). Other factors that explain growth in value added include education, technical training dummy, and years of formal sector experience. The result for technical training is consistent with that in van Biesebroeck (2005) who found a positive impact of technical training on growth among manufacturing firms in nine sub-Saharan African countries. Thus, the fact that education, technical training and formal sector experience enhance enterprise performance among enterprises in Kariobangi is consistent with Hypothesis 2. The dummy for year 2002 is insignificant, while that of the year 2000 is positive and significant, suggesting that firms grew faster in year 2000 than in year 2005 in terms of value added.

Finally, we examine the characteristics of firms that moved from Kariobangi to the Industrial Areas in Table 7. Columns (1) and (2) show the results based on OLS and probit estimation techniques, respectively. The OLS estimates indicate that initial size in the past, years of enterprise operation, years of education, technical training dummy, and years of formal sector experience are positively associated with enterprise transformation from being informal to formal. In terms of probabilities, a 1 percent increase in the past size, years of operation, or years of formal sector experience increases the likelihood of enterprise transformation to formal sector by 10.4 percent, 6.4 percent, 2.4 percent, and 2.3 percent, respectively. These effects, however, become smaller (except for the years of operation that become insignificant) when the equation is estimated using a probit model, which is the right model for equations with categorical dependent variables. The disadvantage of using OLS in estimating equations with categorical dependent variables is that OLS does not confine the probabilities within the 0-1 band. Nonetheless, the basic message is that highly educated entrepreneurs, those with technical training skills and those with many years of formal sector experience are more likely to graduate from informal to formal sector. The results are consistent with Hypothesis 3 that more successful owner managers with these qualities have a higher likelihood of graduating.

Table 7: Determinants of Moving Out to Industrial Area by 2005

Variable	OLS (1)	Probit (dF/dx) (2)
lnLpast	0.104**	0.001**
	(2.60)	(2.41)
Ln(manager's age, years)	0.009	-0.003
	(0.11)	(1.61)
Ln(firm age, years)	0.064*	0.001
	(1.98)	(1.58)
Ln(education, years)	0.024**	0.001**
	(2.27)	(2.37)
If received technical training	0.047*	0.002*
	(1.77)	(1.79)
Formal sector experience (years)	0.023***	0.003***
	(2.77)	(4.04)
If metalwork	-0.046	-0.001
	(1.21)	(1.04)
F-stat/Wald chi^2	1.99*	28.63**
R-squared/Pseudo R^2	0.36	0.70
Log pseudo likelihood	N/A	-6.08
Number of observations	106	106

Note: ***, **, and * denote significant at 1, 5, and 10% levels, respectively.

Numbers in parentheses in equations (1) and (2) are absolute t- and z-statistics, respectively.

5. Conclusions and Recommendations

5.1 Conclusions

The development of the informal MSE sector has recently attracted the attention of policymakers and researchers, partly because the formal sector has not been able to generate increased employment opportunities to absorb the ever-increasing inflow of labour force from poor rural areas into the urban areas, and partly because pro-poor industrial development is necessary to eradicate widespread and chronic poverty. However, the perception that most MSEs in Africa are static, stagnant, or declining because of lack of appropriate technologies, marketing, and management was the motivation of this paper, which sought to examine this issue more critically by drawing new insights into the growth performance of MSEs with particular reference to the metalwork cluster in Nairobi. Broadly, the paper sought to establish whether or not there is evidence of enterprise graduation or transformation from informal to formal status among MSEs in Nairobi.

Descriptively, it is found that about half of entrepreneurs who left large companies in the formal sector to start their own enterprises at Kariobangi are now better off than they were when they worked as employees in the formal sector. Out of those that established enterprises at Kariobangi, a few enterprises had graduated or were about to graduate from being informal to formal by moving to Industrial Areas where infrastructural facilities are better and expansion space is ample. As a whole, the metalwork industry in Kariobangi has been growing both horizontally and vertically. Although most of the enterprises produce crude products using secondhand machinery and tools, some of them have managed to upgrade product quality and to engage in direct marketing strategy.

Based on rigorous analyses, those enterprises that produce high quality products and use direct marketing are those whose managers possess technical training skills and are well educated and have experience in the formal sector before starting their own enterprises. Enterprises whose managers possess these characteristics except for education and those that were large in the past are more likely to undergo transformation from informal to formal status.

5.2 Policy Recommendations

The following recommendations arise from the descriptive statistics as well as regression analyses:

Enhanced enterprise transformation: Considering that enterprise transformation appears to be slow in Kariobangi and given that firms that have undergone this process are more profitable and larger in average size, efforts should be made to hasten the transformation process. This is important in terms of accelerating income and employment generation among MSEs so as to improve on their poverty reduction effect. Three-pronged policy measures can be undertaken to achieve this goal. Firstly, the cost of shifting machinery and equipment should be lowered or eliminated by constructing factories of different sizes within an industrial cluster so that those that are growing can rent adjacent buildings. Moreover, the local government should ensure that residential apartments do not encroach onto the industrial cluster.

Enhanced human capital skills of entrepreneurs and prospective entrepreneurs: The capacity of an enterprise and its workers to engage in product upgrading and other innovative activities hinges on their human capital level and quality. Therefore, it is imperative that the quality of formal education including technical, vocational and internship training be maintained so that they remain relevant to the dynamic labour market requirements. Notwithstanding the significance of high quality formal education on performance as a long-term goal, the importance of providing training is that it improves the ability of an entrepreneur to undertake quality improvement as well as the profitability of the enterprise, thereby attracting highly educated and experienced workers from the formal sector to the cluster. The urge to improve the quality of and access to education and training is consistent with the Government of Kenya's recent Sessional Paper No. 1 of 2005 on *A Policy Framework for Education, Training and Research* (Kenya, 2005) that seeks to provide and promote life-long education and training skills for self-reliance through technical, industrial, vocational and entrepreneurship training (TIVET) institutions. The Sessional Paper observes that due to obsolete and inadequate facilities in TIVET institutions, coupled with inadequate highly trained personnel, most TIVET graduates are not adequately equipped to respond to the needs of the labour market. This statement should be tested empirically in future studies to determine the creativity, productivity and relevance of TIVET graduates in the labour market. Nonetheless, the sessional paper hopes to address this shortcoming, but it is not clear

how this is going to be done. One way to enhance specific labour market skills development is to identify essential skills that are required directly from the labour market and to impart them to the entrepreneurs and workers through onsite training. Skilled and experienced trainers can be sourced from abroad or locally, if available.

Increase exports: although a few enterprises were able to export within Africa, more needs to be done to encourage enterprises to increase exports not only in Africa but also to other continents. Enterprises that export their products should be encouraged and rewarded through appropriate incentives such as the provision of cheap credit. Through public-private partnerships, these and other incentives can be worked out and agreed upon. Other measures to be applied include strategies that ensure that cheap materials, be it scrap or new metal, are available to the entrepreneurs. The recent trend where scrap metal is being exported to Asian countries should be curtailed through a heavy export tax. This will ensure that the escalation of scrap metal prices is contained within reasonable levels.

Promote sector-specific industrial clusters: Given that enterprises in the Kariobangi metalworking cluster have been growing rapidly, especially those operated by entrepreneurs with high human capital skills, it is imperative that more sector-specific clusters be developed since there is evidence that clustered enterprises do better than unclustered ones. As reiterated in past works, the local government should promote sector-specific industrial clusters and provide them with the requisite infrastructure facilities. This can be done through proper planning where industrial land for MSEs is set aside in all urban centres and supplied with the necessary facilities. Efforts can also be made, through public-private partnerships, to provide machines and equipment to entrepreneurs on loan at competitive prices.

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