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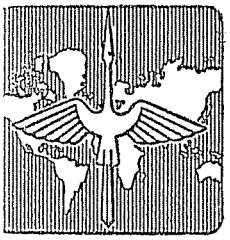

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The views expressed in this paper are those of the author and not necessarily of the Institute of Social Studies.

SCALE, ORGANISATION AND EFFICIENCY IN FOOTWEAR PRODUCTION: AN ANALYSIS OF SOME GHANAIAN DATA

INTRODUCTION

The main objective of this paper is to present an analysis of certain aspects of footwear production in Ghana, with special reference to its profitability in relation to size of the enterprise and to the organisation of its production process. The analysis is based on data which were collected in 1976 and 1977 during a survey which was intended to gain an idea of the kind of techniques applied by Ghanaian footwear producers in their productive processes. Our interest in questions concerning these production techniques, and the levels of mechanisation implied, arose through other studies dealing with choice of techniques in footwear production, especially the preliminary drafts of Boon (1980) and McBain (1977). These studies suggest that footwear production may be carried out with a large variety of production techniques, having different factor intensities. They furthermore show that, given factor prices prevailing in developing countries, the less mechanised, i.e. more labour-intensive alternatives, are the more profitable for most levels of output. In other words, they demonstrate that the lower the level of output, the lower will be the degree of mechanisation of the optimal (i.e. least-cost) technique.

Findings from a first round of our survey, originally applied to 16 footwear firms operating at different scales of production, indicated that production techniques with different degrees of mechanisation are applied, while the larger-scale firms are more mechanised than the smaller-scale firms, thus confirming to some extent the relation-

ship between scale and degree of mechanisation developed in the studies by Boon and McBain, at least in a relative sense (Van Heemst 1977, 1979). In our analysis, we classified these firms according to the distinctions: 'Small Scale' (SS), 'Medium Scale' (MS), and 'Large Scale' (LS), referring respectively to a maximum output of less than 500 pairs of men's sandals per standard working week; between 500 and 1000 pairs; and above 1000 pairs.

It is important to note that all firms, i.e. LS, MS, as well as SS, were characterised by the fact that they carried out all stages of the production process in their own factory or workshop. In other words, none of them made use of subcontracting. We may add that all, whether large-scale or small-scale, make use of some machinery; even the SS firms had at least one electric machine.

Not all footwear enterprises in Ghana have these characteristics, however, as became clear during our survey. A large, fairly distinct group of small-scale, informal footwear enterprises do not make use of any machinery, except perhaps for a manually-operated second-hand sewing machine, relying for those stages in the production process carried out by them on the labour input of the entrepreneur and his workers - usually only a few apprentices - and some tools.

These enterprises, which can be found operating in large numbers in the major markets, have organised their production in such a way that some stages in the production process, especially stitching and finishing, are subcontracted to others operating in the vicinity who specialise in one stage of the process only.[1] These subcontractors, who often also operate in small numbers in the same market place, have some electric machines at their disposal with which they carry out their sub-

contracting activities and for which they normally charge a moderate amount to the subcontracting producer.

During a second round of the survey, data were collected among a number of these 'market stall' producers in order that this method of footwear production might be incorporated in our analysis. The findings obtained when we repeated our analysis on this extended basis, strengthened the relationship already observed for other firms with regard to scale and degree of mechanisation. At the same time, however, the new findings suggested a relatively high profitability of this particular method of small-scale production in relation not only to SS firms, but also to MS and LS firms. This finding, although only indicative in view of the relatively few observations on which it is based, caught our interest since it suggested a more favourable position of small-scale footwear production vis-à-vis large-scale production than had been concluded by others. The results of an economic evaluation by McBain & Pickett (1975) of footwear production in Ethiopia for different scales of production, had shown a very low profitability of small-scale production as compared to large-scale; according to those authors, such evidence is not encouraging for those who would put their faith in small-scale organisation. Subcontracting practices did not play a role in that analysis, however, which may be one of the reasons why its findings differ from ours. We then decided to further analyse our data, in an attempt to determine the factors that might explain the relatively high profitability of the fairly homogenous group of small-scale 'market-stall' producers observed by us. The findings of this analysis, which actually is a comparative cost analysis of the various groups of footwear producers, may give some idea about the stronger points of certain ways of small-scale footwear production in

TABLE I

Some data for 27 Ghanaian footwear enterprises; maximum output

(1) Firm	(2) Group	(3) Annual Output, in pairs of men's sandals	(4) Mechanisation index	(5) Value of equipment and tools per unit output (Cedis)	(6) No. of productive workers	(7) Manhours per unit output	(8) Net benefits per unit output (Cedis)
1	VSS	2,000	2.0+	0.001	3.8	4.20x	2.614
2	"	2,500	2.0+	0.006	2.8	2.48x	2.798
3	"	2,600	2.0+	0.002	6.8	5.78x	2.675
4	"	2,800	2.0++	0.002	2.8	2.21x	2.859
5	"	2,800	1.5+	0.013	4.8	3.63x	2.636
6	"	3,100	2.0+	0.005	5.8	4.14x	2.207
7	"	3,100	2.0+	0.002	1.8	1.28x	2.941
8	"	3,300	2.0+	0.003	5.8	3.88x	2.850
9	"	3,500	2.0+	0.001	0.8	0.50x	3.018
10	"	3,700	2.0++	0.002	8.8	5.26x	2.828
11	"	4,100	1.5+	0.010	1.8	0.97x	2.960
12	"	4,400	2.0	0.006	6.8	3.42x	2.955
13	SS	4,800	2.5	0.297	10.8	4.97	0.380
14	"	4,900	2.5	0.329	11.8	5.32	0.719
15	"	7,100	2.0	0.151	13.8	4.30	1.329
16	"	9,200	2.5	0.100	25.8	6.20	1.710
17	"	11,100	4.0	0.222	13.8	2.75	1.703
18	"	12,300	2.5	0.249	16.8	3.02	1.758
19	"	13,000	4.0	0.140	22.0	3.74	1.584
20	"	15,600	3.0	0.158	13.8	1.95	2.377
21	"	16,200	3.5	0.147	19.8	2.70	2.099
22	MS	29,500	4.0	0.197	62	4.64	1.330
23	"	30,400	5.0	0.202	21	1.53	2.532
24	LS	130,000	5.0	0.081	137	2.33	2.703
25	"	130,000	5.0	0.057	56	0.95	3.196
26	"	208,000	5.0	0.053	102	1.08	3.221
27	"	1,062,500	5.0	0.078	373	0.78	3.436

+ Includes the subcontracted sewing and finishing stages.
++ Includes the subcontracted finishing stage.
x Labour inputs for the subcontracted stages not included.

TABLE II

Some data for 27 Ghanaian footwear enteprises;

50 percent of maximum output

(1) Firm	(2) Group	(3) Annual Output in pairs of men's sandals	(4) Mechani-sation index	(5) Value of equipment and tools per unit output (Cedis)	(6) No. of productive workers	(7) Manhours per unit output	(8) Net benefits per unit output (Cedis)
1	VSS	1,000	2.0+	0.002	1.8	3.98x	2.056
2	"	1,250	2.0+	0.012	1.8	3.18x	2.309
3	"	1,300	2.0+	0.004	2.8	4.76x	2.282
4	"	1,400	2.0++	0.004	1.8	2.84x	2.422
5	"	1,400	1.5+	0.026	2.8	4.42x	2.415
6	"	1,550	2.0+	0.010	2.8	3.99x	2.046
7	"	1,550	2.0+	0.004	0.8	1.14x	2.581
8	"	1,650	2.0+	0.006	2.8	3.75x	2.510
9	"	1,750	2.0+	0.002	0.8	1.01x	2.671
10	"	1,850	2.0++	0.004	3.8	4.54x	2.551
11	"	2,050	1.5+	0.020	1.8	1.94x	2.785
12	"	2,200	2.0	0.012	2.8	2.81x	2.720
13	SS	2,400	2.5	0.594	7.8	7.18	-0.834
14	"	2,450	2.5	0.658	7.8	7.04	-0.618
15	"	3,550	2.0	0.302	7.8	4.86	0.699
16	"	4,600	2.5	0.200	13.8	6.63	1.243
17	"	5,550	4.0	0.444	8.8	3.50	1.044
18	"	6,150	2.5	0.498	11.8	4.24	1.219
19	"	6,500	2.0	0.280	12.0	4.08	1.110
20	"	7,800	3.0	0.316	9.8	2.78	1.917
21	"	8,100	3.5	0.294	10.8	2.95	1.745
22	MS	14,750	4.0	0.394	35	5.24	0.442
23	"	15,200	5.0	0.404	16	2.33	1.532
24	LS	65,000	5.0	0.162	89	3.03	2.038
25	"	65,000	5.0	0.114	31	1.05	2.765
26	"	104,000	5.0	0.106	57	1.21	2.851
27	"	531,250	5.0	0.156	280	1.16	3.086

+ Includes the subcontracted sewing and finishing stages.
++ Includes the subcontracted finishing stage.
x Labour inputs for the subcontracted stages not included.

comparison to larger-scale production. As such, it may perhaps add something to the more general discussion re the prospects for small-scale, informal activities in developing countries.

The main findings from our analysis may be summarised as follows. In the first place, small-scale footwear production may, under certain circumstances, be carried out at relatively low cost per unit of output, giving it a distinct cost advantage over larger-scale production with a favourable effect on its competitiveness, at least up to a certain size and despite the fact that larger-scale producers have lower raw material costs. Secondly, it was found that factors related to the organisation of the production process - more specifically to sub-contracting - are important determinants of the relative cost advantages observed, together with low labour cost, absence of overheads, and low levels of investment in working capital.

In what follows, we shall present first some general data that characterise the footwear firms studied,[2] including the profitability estimates, and shall then analyse the composition of the costs of production. In the rest of this paper, we shall distinguish 'market-stall' producers from other small-scale producers by referring to them as 'Very Small Scale' (VSS), since their average level of output is lower than that of the 'Small Scale' (SS) producers. We shall also make specific reference to sandal production, for reasons outlined below. The sandal-making process which, technically speaking is fairly simple, can be broken down into the following main stages.

1. The cutting stage, in which upper parts, insoles and soles are cut according to required shape, design and size.

2. The manipulations preparation stage, in which marking, skiving (i.e. evening-out the thickness of the leather) and embossing is done.

3. The stitching or sewing stage, in which the upper parts are stitched together, and eyeletting is done.

4. The lasting stage, in which the upper parts are attached to the inner sole.

5. The bottoming stage, in which the inner sole together with the attached upper part is glued to the outer sole.

6. The finishing stage, in which edges are trimmed, buckles are attached, cleaning and polishing is done.

In each of these stages the operations could be more or less mechanised, ranging from the almost completely manual (with some tools) to the completely mechanised.[3]

SOME ASPECTS OF 27 GHANAIAN FOOTWEAR ENTERPRISES

Tables I, II and III present data relating to 27 Ghanaian footwear firms.[4] Table I gives data for individual firms with special reference to maximum output; Table II gives similar data with reference to an output level of 50% of maximum output; and Table III gives averages for each group of firms as derived from Tables I and II.

Starting with Table I, and assuming that columns (1) and (2) speak for themselves, we may note that column (3) refers to the maximum output that could be achieved by the firm in question - given its existing machinery and with optimum manpower - of a common type of footwear, namely men's sandals with artificial leather uppers

on micro-cellular rubber soles, while expressing maximum output in terms of annual equivalent.[5]

The reason for stating maximum output in terms of the particular type of footwear is that, to enable a comparison between firms, reference had to be made to a particular type of footwear produced by all firms. Since most VSS and SS firms produce sandals only, while MS and LS firms also produce other types of footwear, the type of sandal mentioned above was selected as the product of reference for our study.[6]

The data in column (4), the mechanisation index, indicate the extent to which the footwear production processes carried out by the producer or subcontractor[7] have been mechanised. The index gives the sum of the values attached by us to five of the more important stages, i.e. cutting, sewing, lasting, bottoming, and finishing. When all these stages are mechanised the index has a value of 5.0; when they take place by hand its value equals 0.0.[8]

Column (5) gives the value of machines and tools in 1975 prices, expressed in terms of annual cost[9] on the basis of a 10 per cent discount rate and an assumed project life for the machines of 20 years, while being divided by annual output. This gives an idea of the cost per unit of output of the equipment used within the firm in the production of the sandals.

Column (6) shows the manpower position, indicated by the producer, which is to be associated with the maximum output level; i.e. the number of people involved in direct productive activities. For VSS and most SS firms the figures are not round numbers, showing that the producer is also engaged (for roughly 80 per cent of his total working time) in the direct production process. Furthermore, the labour pool of the VSS firm is composed mainly of apprentices, although in a few cases a skilled

labourer may also be employed. SS firms make use of skilled labourers, unskilled labourers and apprentices. The MS and LS firms studied by us employed only skilled and unskilled labourers, i.e. no apprentices.

The data in column (7) reflect the labour intensity with which sandal production takes place. It should be kept in mind that most VSS firms do not carry out the sewing and finishing stages themselves, hence no labour is involved in these activities. For this reason we might expect a somewhat lower (average) labour-intensity for VSS firms in comparison with the group closest to them, the SS firms.

Column (8) refers to the profitability for each firm estimated on the basis of maximum production of sandals. The estimates were arrived at by calculating the Net Present Value of the inputs and outputs involved in sandal production - assuming a discount rate of 10 per cent per year and a production cycle of 20 years - after which these NPVs were converted to an annual basis and divided by annual output. The calculations are based on 1975 prices and values. With regard to output, we used a price of ¢7.25 per pair of sandals. Re raw materials inputs, we used a value of ¢3.75 per pair of sandals for VSS and SS firms, and ¢3.00 for MS and LS firms, the difference between the two values being that large-scale firms pay less for their raw materials (cf Aryee 1977:58).

The wage rates that have been applied for the various types of labour reflect the situation in the Ghanaian footwear industry in 1975. For MS and LS firms these rates are: skilled labour - ¢84.25 per month; unskilled labour - ¢53.35 per month. For VSS and SS firms the rates used are: skilled labour - ¢60.35 per month; unskilled labour - ¢30.00 per month; apprentices -

¢8.00 per month. The apprentices' rate is computed from an estimate of the value of the meals and pocket money the apprentice receives in compensation for his labour. The rate shows that this kind of labour is a comparatively cheap factor of production.[10]

Table II presents similar data to those in Table I, making particular reference to output levels which are only 50 per cent of maximum output. In all firms observed, actual output rates were well below maximum output. Various reasons might explain the phenomenon that actual output ranged somewhere between 80 per cent and 20 per cent of maximum output, including lack of raw materials, lack of finance and, to some extent also, lack of demand.

To bring our analysis closer to reality, we established an output level of 50 per cent - produced with an adjusted labour force and with existing equipment - with a set of data similar to that given in Table I for the maximum output case. This percentage of 50 is considered to average a fair approximation of actual production as related to maximum levels.

In Table III, the averages for various groups of producers summarise the data in Tables I and II, and also characterise the various groups to some extent.

On the basis of the data presented in Tables I to III, the following observations may be made with respect to footwear production in Ghana.

Firstly, the mechanisation index clearly suggests a possible relationship between degree of mechanisation and level of output. This finding is in line with empirical evidence from studies for other countries.[11] It also suggests that the technological behaviour of Ghanaian footwear producers is generally in line with results of studies of the optimal choice of techniques in footwear production, which indicate that the larger

TABLE III

Averages of Table I (maximum output) and Table II (50% of maximum output)

Group	Annual Output, in pairs of men's sandals	Mechanisation index	Value of equipment and tools per unit output (Cedis)	No. of productive workers	Manhours per unit output	Net benefits per unit output[1] (Cedis)
			/100%/[2]			
VSS	3,160	1.9[+]	0.004	4.4	3.15	2.778 (0.223)
SS	10,470	3.0	0.199	16.4	3.89	1.518 (0.630)
MS	29,950	4.5	0.200	41.5	3.09	1.931 (0.849)
LS	382,625	5.0	0.067	167.0	1.29	3.139 (0.310)
			/50%/[3]			
VSS	1,580	1.9[+]	0.008	2.2	3.20	2.446 (0.240)
SS	5,235	3.0	0.398	8.8	4.81	0.835 (0.958)
MS	14,975	4.5	0.399	25.5	3.79	0.987 (0.771)
LS	191,315	5.0	0.135	114.0	1.61	2.685 (0.452)

[+] Including subcontracted stages.

1. The expressions in parentheses represent standard errors.
2. Maximum output.
3. 50% of maximum output..

the scale of production, the more mechanised are the optimal techniques (Boon 1980: ch. 3; McBain 1977: ch. 7).

A second observation concerns estimates of the value of equipment and tools per unit of output (which double for all firms when going from 100 to 50 per cent output since these fixed assets do not change), and of manhours per unit of output (which increase somewhat for most firms, when going from 100 to 50 per cent, because the reduction in the number of production workers is usually less than proportional to the reduction in output). The tables show that when one moves from SS values for these expressions of capital intensity and labour intensity to LS values, both sets of values tend to decline. This is particularly clear in Table III. With regard to manhours per unit of output, this may be explained by increase in the mechanisation rate, while the fall in capital intensity - which occurs in spite of increasing mechanisation - may be explained by assuming economies of scale. The latter explanation is supported by the findings of other studies which indicate that production processes in the footwear industry are subject to scale economies over certain ranges of output (McBain 1977).

When we look at values for VSS firms in relation to manhours per unit of output, however, we note that they are smaller (at least on average) than those for SS firms in the 100 per cent output case, while in the 50 per cent output case they are smaller than those for SS and MS firms. This anomaly may be solved, however, when we realise that VSS firms subcontract some stages of their productive process to others, as a consequence of which less time will be spent on average on producing a pair of sandals within the enterprise, resulting in lower manhours per pair as compared to those operating

on similar scales of output which carry out all stages themselves.

Furthermore, the fact that within a given group (VSS, SS, etc.) labour-intensities vary enormously, even sometimes between firms which have more or less the same degree of mechanisation and the same output level (e.g. firms 7 and 8, or 16 and 17), should be interpreted on the one hand as reflecting differences in quality of labour (an hour's work by a skilled labourer is not the same as that by an apprentice), and on the other hand as reflecting differences in organisational and managerial efficiency.

With regard to profitability, expressed in terms of net annual benefits per unit of output, in both cases (i.e. maximum output and 50 per cent of maximum output) a similar, interesting and somewhat surprising pattern may be observed. It appears that the profitability average of VSS firms is substantially higher than that for SS and MS firms, while it is only somewhat smaller than that for LS firms. In fact, the differences between VSS and SS firms - to be analysed in more detail below - become even more pronounced when looking at the 50 per cent output data, although it might be noted that the spreading around the profitability average for SS firms is rather large, as indicated by the standard error.

As far as averages for SS, MS and LS firms are concerned, they show in comparison with each other a pattern that could be more or less expected; namely, increased profitability with increasing scale, reflecting the earlier suggested presence of economies of scale in the footwear industry.

When output declines from 100 to 50 per cent, a decrease in net benefits per unit of output may be observed which is explained by the fact that some costs

of production are fixed, as a result of which costs per unit of output increase with a decline in the output level. Moreover, such a decline will result in some firms operating at a loss, namely, firms 13 and 14. This may be partially explained by the fact that the degree of mechanisation of these firms is relatively high for the levels of output at which they operate; as a consequence, the implied cost of equipment unduly influences profitability in a negative way.

Various factors may more or less explain the relatively high profitability of VSS firms, as shown by the kind of analysis conducted by us. In the first place, overhead costs are low. For example, the premises in which they operate cost hardly anything, while expenditure on overhead personnel is virtually lacking. This also applies to certain other expenditures of an overhead nature, e.g. vehicles, office equipment, etc. A second factor is that of the low working capital invested in the business, although this also makes the business more vulnerable. The relatively great dependence on cheap apprentice labour may be mentioned as a third factor, while last but not least, the extremely low cost of productive equipment combined with relatively low cost for subcontracting also plays a role. While all these factors to some extent contribute to lower costs per unit of output, it should be remembered that VSS firms pay more for their raw materials than do MS and LS firms. The profitability of this really small-scale, relatively labour-intensive and capital-saving way of footwear production nevertheless seems fairly high, as may be concluded from the analysis.

While we realise the limitations of our findings, considering the kind of analysis applied and the number of observations involved, the results are nevertheless intriguing enough for further analysis. Moreover, a t-test for comparing two means, conducted with regard to the profitability average of VSS and SS firms, showed a significant difference at the one per cent level between the means for these two groups, for both the maximum and the 50 per cent of maximum output case.[12] In the following we hope by means of a cost analysis to shed more light on differences in profitability of the various groups.

COST ANALYSIS

In Table IV we present averages for the four groups of firms with regard to the major components of their cost per unit of output. These averages are derived from the data for individual firms presented in Tables A.1 and A.2 in the Appendix, referring again to the maximum output and the 50 per cent of maximum output case. All data have been calculated on an annual basis. Table IV also gives the various cost elements per unit of output expressed as percentages of the output price per pair of sandals, ¢7.25. Before analysing Table IV, however, the following may be said with respect to the various headings.

Assuming that column (1) speaks for itself, it should be noted that column (2), 'Total Unit Costs', represents the sum of the cost components in columns (4) to (8). 'Direct Labour Costs' in column (3) refers to the cost of labour directly related to the main production process, inasfar as this takes place inside the firm.[13]

The data in column (4), 'Capital Costs and Current Cost of Productive Equipment', represent the value, as converted to an annual basis, of machinery and tools including maintenance and repairs outlays, and electricity expenditure related to machinery and tools.[14] Column (5), 'Subcontracting Costs', is applicable only to VSS firms, and represents the cost per unit of output of subcontracting activities as they play a role in the sandal-making process.

Column (6), 'Overhead Costs' is composed of diverse cost elements that are less directly related to the production process. They comprise the cost of physical structures, whether rented or owned,[15] in which the activities are carried out, including expenditure on maintenance and repairs, office equipment, etc.; the cost of all labour inputs not directly related to the production process, i.e. wages and salaries of managerial and administrative personnel, of drivers, etc; capital and current costs related to vehicles (if any); administrative, sales, and other expenditures of a general nature.[16]

'Working Capital Costs' (column (7)), refers to the cost per unit of output of the monies that have been tied up in stocks of raw materials, stocks of finished goods, credit to customers and cash reserves. VSS firms were found to have relatively little working capital invested, while in the case of other types of firms, larger amounts of working capital appeared to play a role. The averages for the various types of firms are assumed to reflect the role played by working capital in their activities.[17]

'Raw Material Costs', in column (8), speaks for itself; large-scale firms pay less for their raw materials than small-scale ones, as noted earlier.

Because columns (3), (4) and (5) refer to the cost of those inputs which are directly related to the production process as such, i.e. direct production costs, we have indicated for each type of firm the sum of the three columns in order to obtain the total direct production cost. This will shed light on the economic efficiency with which sandal-making is carried out among the various groups of producers.

Inspection of Table IV discloses the fairly favourable cost position of VSS firms vis-à-vis others; as one moves from the 100 per cent output level to the 50 per cent level, this position improves relatively, since the percentage increase in total costs of VSS firms is less than of the others. This is not surprising since VSS firms have very few fixed costs in comparison to the others; this can be seen from the values given for overhead costs, bearing in mind that these are largely of a fixed nature.

SS firms, on the other hand, appear to have the highest cost per unit of output. When operating at a 50 per cent level of maximum output, their unit costs leave little room for profit: less than four per cent given an output price of ¢7.25.

Total unit costs of MS firms are somewhat less than those of SS firms, although their direct labour costs appear to be a little higher since they pay formal sector wage rates.[18] They enjoy, on the other hand, the advantage of lower raw material costs. The LS average of total unit costs is lowest of all, both at the 100 per cent and the 50 per cent level, reflecting the fact that large footwear firms enjoy economies of scale, not only with regard to the production process in a technical sense, but also financially, e.g. through having lower raw material costs.

TABLE IV

Cost Composition on Unit Output Basis; Averages for the Four Groups

(1) Maximum Output

	(1) Net Benefits	(2) Total Costs (sum of (3) to (8))	(3) Direct Labour Costs	(4) Capital Cost & Current Cost of Productive Equipment	(5) Sub-contracting Costs	(6) Over-head Costs	(7) Working Capital Costs	(8) Raw Material Costs
				ABSOLUTE FIGURES[1]				
VSS	2.778	4.472	0.512	0.004	0.091	0.083	0.032	3.750
				0.607				
SS	1.518	5.732	0.883	0.518	-	0.436	0.145	3.750
				1.401				
MS	1.931	5.319	1.212	0.514	-	0.442	0.151	3.000
				1.726				
LS	3.139	4.111	0.498	0.172	-	0.279	0.162	3.000
				0.670				
				PERCENTAGES				
VSS	38.32	61.7	7.1	0.1	1.3	1.1	0.4	51.7
				8.5				
SS	20.9	79.1	12.2	7.1	-	6.0	2.1	51.7
				19.3				
MS	26.6	73.4	16.7	7.1	-	6.1	2.1	41.4
				23.8				
LS	43.3	56.7	6.8	2.5	-	3.8	2.2	41.4
				9.3				

1. In Cedis.

Table IV (cont.)

Cost Composition on Unit Output Basis; Averages for the Four Groups

(2) 50% of Maximum Output

	(1) Net Benefits	(2) Total Costs (Sum of (3) to (8))	(3) Direct Labour Costs	(4) Capital Cost & Current Cost of Productive Equipment	(5) Sub-contracting Costs	(6) Over-head Costs	(7) Working Capital Costs	(8) Raw Material Costs
				ABSOLUTE FIGURES[1]				
VSS	2.446	4.804	0.758	0.009	0.091	0.164	0.032	3.750
				0.858				
SS	0.835	6.415	1.014	0.702	-	0.792	0.157	3.750
				1.716				
MS	0.987	6.263	1.520	0.709	-	0.856	0.178	3.000
				2.229				
LS	2.685	4.565	0.627	0.239	-	0.529	0.170	3.000
				0.866				
				PERCENTAGES				
VSS	33.7	66.3	10.5	0.1	1.3	2.3	0.4	51.7
				11.9				
SS	11.5	88.5	14.0	9.7	-	10.9	2.2	51.7
				23.7				
MS	13.6	86.4	21.0	9.8	-	11.8	2.4	41.4
				30.8				
LS	37.0	63.0	8.6	3.4	-	7.3	2.3	41.4
				12.0				

1. In Cedis.

Direct labour costs (column (7)) vary from 6.8 per cent to 16.7 per cent in the maximum output case, and from 8.6 to 21.0 per cent in the case of 50 per cent of maximum output, variations which reflect differences in labour-intensity as well as in wage rates. Differences in labour-intensity may in turn be explained by differences in technical and organisational efficiency and in the level of mechanisation, and by the fact that VSS firms subcontract some stages of the production process. For all types, the 'direct labour costs' component is the largest but one (only 'raw materials costs' is larger) among those distinguished by us, indicating that footwear production is a relatively labour-intensive activity.

Costs of productive equipment, column (4), vary enormously between the various types of firms, namely, from 0.1 per cent to 9.8 per cent in the case of 50 per cent of maximum output. In this case, the differences should be explained largely by differences in the level of mechanisation and in technical and organisational efficiency, and again by the subcontracting phenomenon.[19] Nevertheless, for all types of firms the costs of productive equipment play a relatively moderate role on average in the total cost of production. Even in the case of MS firms, these costs represent only 7.1 (9.8) per cent in terms of the output price, which equals 9.7 (11.3) per cent in terms of total costs. The virtual absence of productive equipment cost in the case of VSS producers, most of whom use only simple hand-tools, is most striking. On the other hand, it should be realised that 'Subcontracting Costs' (column 5) paid by VSS firms represent to some extent an element of 'external' labour costs, since they relate to charges for services rendered by third parties which embody labour as well as equipment inputs. Table IV shows that subcontracting costs constitute only a minor fraction of the total costs of VSS producers.

The sum of columns (3) to (5) may be considered to represent the direct costs of production, which vary from 8.5 per cent to almost 24 per cent in the 100 per cent output case, while in the case of 50 per cent output level, they vary from 11.8 to 30.8 per cent. Expressed as a percentage of total costs, these direct costs mean a variation from 13.5 to 32.5 per cent, and from 17.8 to almost 30.6 per cent in the two respective output level cases. The VSS firms have the lowest direct production costs, even less than the LS firms in the 100 per cent case. This may indicate that, on average, VSS producers have organised their production process very efficiently in comparison to the other types of firms.

Data on overhead costs suggest that, in this respect also, VSS firms enjoy cost advantages over the others. In terms of output price, these costs are only 1.1 per cent for VSS firms in the 100 per cent output level case, while in the 50 per cent case they amount to little more than two per cent. In comparison: for MS firms, overhead costs are 6.4 per cent and 11.8 per cent respectively. The very low level of overhead costs for VSS firms is explained by factors already mentioned, viz. total absence of managerial and administrative personnel, low rent for the stalls in which they work, no additional facilities.

Data on working capital costs reflect the practices within the various groups. For VSS firms these costs are virtually negligible, while for the other types they are of relatively modest magnitude in comparison with other cost categories. Table IV thus shows that VSS firms have a number of cost advantages over SS and MS firms, indicating certain strong aspects of this particular form of small-scale footwear production as seen from an economic perspective.

TABLE V

Differences in Total Cost and Cost Components between Averages for Some Types of Firms; Absolute Figures

Differences between	(1) Total Unit Costs (sum of (2) to (7))	(2) Direct Labour Costs	(3) Capital Cost & Current Cost of Productive Equipment	(4) Sub-contracting Costs	(5) Over-head Costs	(6) Working Capital Costs	(7) Raw Material Costs
			/100 %/[2]				
SS-VSS	1.260	0.371	0.514	-0.091	0.353	0.113	-
			0.794				
MS-VSS	0.847	0.700	0.510	-0.091	0.359	0.119	-0.750
			1.119				
LS-VSS	-0.361	-0.014	0.168	-0.091	0.196	0.130	-0.750
			0.063				
SS-LS	1.621	0.385	0.346	-	0.157	-0.017	0.750
			0.731				
			/50 %/[3]				
SS-VSS	1.611	0.256	0.693	-0.091	0.628	0.125	-
			0.858				
MS-VSS	1.459	0.762	0.700	-0.091	0.692	0.146	-0.750
			1.371				
LS-VSS	-0.239	-0.131	0.230	-0.091	0.365	0.138	-0.750
			0.008				
SS-LS	1.850	0.387	0.463	-	0.263	-0.013	0.750
			0.850				

(1) in Cedis. (2) Maximum Output (3) 50% of maximum output.

Table V shows more explicitly the various cost advantages and disadvantages of VSS firms. In this table, which is derived from Table IV, the differences are presented in values of total costs and of cost components as existing between SS and VSS firms, MS and VSS firms, LS and VSS firms, as well as between SS and LS firms. This enables us to see directly which cost elements contribute to the difference in cost per unit of output between VSS firms on the one hand, and SS, MS and LS firms respectively on the other hand, and to contrast this with the difference between SS and LS firms.

Table V shows that the cost advantages of VSS firms over the SS and MS firms are caused mainly by differences in direct production costs, while differences in overhead costs play a somewhat smaller role and those in working capital costs the smallest role. Expressed as a percentage of output price, the direct production cost differential between SS and VSS firms appears to be 11.0 per cent for the 100 per cent output case, and 11.8 per cent for the 50 per cent output case. For MS and VSS firms these figures are 15.3 and 18.9 per cent respectively. We shall return to this considerable direct production cost advantage of the VSS over SS firms and over MS firms in order to analyse to what extent it results from differences in wage rates on the one hand, and from differences in organisation of the production process on the other. For the time being we observe that the various partial advantages of VSS over MS firms are counterbalanced by a raw material cost disadvantage.

In comparison to LS firms, VSS firms also have a raw material disadvantage. Nevertheless, even these VSS firms appear to have some relatively small advantages, in particular with regard to overhead costs and working capital costs. This is not surprising, considering the virtual absence of overhead facilities among VSS producers,

and their low investments in working capital. It may be pointed out, however, that this low investment in working capital by VSS producers constitutes a cost advantage for them on the one hand, not only over LS firms but also over SS and MS firms; but on the other hand, it also constitutes a substantial risk. This risk has to be accepted by VSS producers since they lack sufficient cash for more substantial investments in working capital; they have, moreover, no easy access to raw materials supplies - an important working capital element - for various reasons including the fact that they cannot obtain import licences for raw materials. The risk may lead to shortages in raw materials, leading in turn to low levels of production, or even to complete termination of production. These considerations should qualify the findings from our analysis, since they are based on the assumption of continuous production; the analysis at the 50 per cent output level has been conducted, however, with a view to catching some of the more realistic circumstances faced by the producers resulting from, for example, raw material deficiencies.

To return to the LS-VSS cost differences, it can be calculated from Table V that the sum of the cost advantages of VSS firms is counterbalanced by a larger raw material cost disadvantage, resulting in a somewhat higher unit cost for VSS in comparison with LS firms.

The data relating to cost differences of SS-LS firms elucidate the cost elements which contribute to the considerable disadvantage of SS firms.[20] Direct production costs explain almost half of it, while the raw material cost difference also plays a significant role, constituting about one-third of the disadvantage. The overhead cost element appears to be much smaller, while the only SS advantage, stemming from lower working capital costs, is negligible.

It may thus be concluded that the substantial cost advantage of one form of small-scale footwear production - i.e. that inherent to VSS firms - over the other - i.e. that inherent to SS firms - stems to a major extent from lower direct production costs of VSS firms. These lower production costs also play an important role in the cost advantage which they have over MS firms, and even form part of the cost categories for which VSS have an advantage over LS firms. The lower raw material costs of LS firms over-compensate the cost advantages of VSS firms, however, for which reason the former have lower unit costs.

We return now to the question of which factors may explain the advantage in direct production costs enjoyed by VSS firms over the others. We know that there are differences in the ways in which various types of producers have organised their production; more specifically, we may think here of the VSS producers who subcontract certain stages of their production processes, as opposed to the others who carry out all stages themselves. These differences in organisation of the production process may lead to differences in the use of factor inputs, which in turn may result in differences in direct factor costs. According to this reasoning, the observed differences in direct factor costs might be explained by factors which are related to organisational and technical aspects of the production processes of the various groups of producers, and as such give an indication of the efficiency of the production processes. The phenomenon that the different types of footwear firms pay varying wage rates for similar types of labour inputs can not be neglected in this connection, since this will also contribute to some extent to the differences in direct production cost. To gain some idea of the contribution made in this respect by technico-organisational

factors per se, we try to eliminate the effect of different wage rates on differences in direct production costs. In an attempt to establish how much of direct production costs differences may be attributed to technico-organisational factors, the following calculations aim at eliminating the differential wage rates effect.

In the first place we have re-calculated direct labour cost for VSS and SS firms by valuing apprenticed labour at the rate of unskilled labour for the unorganised sector. By doing so, we have cancelled-out a possible wage rate advantage of VSS firms - which rely fairly heavily on apprentice labour - over SS firms; our calculations are justified by the consideration that basically little difference exists between the quality of apprentice labour and that of unskilled labour in the small-scale sector of the footwear industry.

In the second place we have re-calculated direct labour costs for MS and LS firms by valuing their skilled and unskilled labour at the wage rates for the unorganised sector. This cancels out the wage rate advantage of VSS and SS firms over MS and LS firms.

In Table VI we present labour costs as artificially neutralised for wage rate differences; the new total for direct production costs; and the new differentials for SS, MS and LS firms with regard to VSS firms. These should now indicate the impact of factors related to organisation of the production process on the direct costs of production.

The data in Table VI show that if wage rate differentials between VSS and SS firms are removed, a substantial difference in direct production costs still remains for both output levels, namely ¢0.618 and ¢0.772 respectively, i.e. in percentages of the output price 8.5 and 10.6 per cent respectively, and in percentages of total cost advantage 57.0 and 50.6 per cent respective-

ly. It is plausible to attribute these considerable differences to differences in organisation of the production process between the two types of firms, leading to the conclusion that, ceteris paribus, small-scale footwear production is more efficiently carried out by VSS producers, with their few tools and subcontracting practices, than by SS producers who, usually with some machinery, carry out the entire production process themselves. Thus, the total cost advantage observed for VSS firms over SS firms seems to be attributable to organisational-technical differences; while wage differentials, differences in overheads and in working capital, also play a less prominent role.

The differences in direct production costs between MS and VSS firms diminish considerably if wage rate differentials between them are removed, although the VSS firms keep a substantial advantage, namely, ¢0.471 and ¢0.696 respectively. This advantage may again be associated with differences in the organisation of the production process between the two types of firm. Together with advantages from wage rate differentials, from differences in overheads and in working capital, this contributes to the total cost advantage of VSS over MS firms. This total is reduced by a raw material disadvantage, as we have seen earlier.

Finally, Table VI suggests that the production process of the LS producers is more efficient than that of VSS producers, because, if wage rate differentials are removed, the latter have somewhat higher direct production costs than the former. Apparently this technical-organisational advantage enjoyed by VSS firms vis-à-vis SS and MS producers is not enough to compensate for the scale disadvantage they have with respect to LS firms. However, this efficiency disadvantage is compensated for by a wage differential, which explains why their original direct production costs are less than those of LS firms.

TABLE VI

Actual and Neutralised Direct Labour Cost and Total Direct Production Costs, and Some Selected Differentials[1]

	100%[2]				50%[3]			
	Actual		Neutralised		Actual		Neutralised	
	DLC[+]	TDPC[++]	DLC[+]	TDPC[++]	DLC[+]	TDPC[++]	DLC[+]	TDPC[++]
				/ABSOLUTE/				
VSS	0.512	0.607	0.783	0.878	0.758	0.858	0.985	1.085
SS	0.883	1.401	0.978	1.496	1.014	1.716	1.155	1.857
MS	1.212	1.726	0.835	1.349	1.520	2.229	1.072	1.781
LS	0.498	0.670	0.340	0.512	0.627	0.866	0.430	0.669
				/SELECTED DIFFERENCES/				
/SS-VSS/	0.371	0.794	0.195	0.618	0.256	0.858	0.170	0.772
/MS-VSS/	0.700	1.119	0.052	0.471	0.762	1.371	0.087	0.696
/LS-VSS/	-0.014	0.063	-0.443	-0.366	-0.131	0.008	-0.555	-0.416

[+] DLC : Direct Labour Costs
[++] TDPC: Total Direct Production Costs

1. In Cedis.
2. Maximum Output.
3. 50 percent of maximum output.

In conclusion, our analysis suggests that the particular way in which VSS producers have organised their production process in comparison with SS and MS firms, seems to be an important factor in explaining their considerable cost advantage over the others. This factor also seems to contribute to the fair performance of VSS firms vis-à-vis LS firms.

FURTHER REMARKS

Among the various parameters used in the above analysis is that of a discount rate of 10 per cent per annum. One may wonder how the results of this analysis would have been affected if a higher discount rate, say of 20 per cent, had been taken. Two possibilities may be considered; firstly, one in which a higher discount rate is applied only in the calculations for VSS and SS firms; secondly, one in which a higher rate is applied for all types of firms. The first case might be considered a suitable way to reflect the fact that smaller-scale firms in developing countries often face higher cpaital costs than large-scale firms, while the second case simply assumes higher costs of capital for all types of firms. It may be argued that in the former case, the total costs of SS firms will increase due to increases in direct production costs, overhead costs and working capital costs, which all contain capital elements. The costs of MS and LS firms, of course, will not change, while those of VSS producers will hardly change either, considering the minimal amounts of capital items embodied in their production processes. Consequently, the VSS advantage over SS firms will increase, while the MS-VSS costs differential, as well as the LS-VSS cost differential, will change little.

With regard to the second case (i.e. the overall increase in discount rates), it may be argued that the resulting increase in costs of SS, MS and LS firms will certainly exceed the minor cost increase of VSS firms, since the former three types operate with considerably more capital than the latter.

To sum up, higher discount rates will in no case yield substantially lower cost advantages for VSS firms over other types, while in most cases it will only give a larger advantage, ceteris paribus.

All machines have been valued at 1975 replacement values in order to standardise the calculations. Some footwear producers, however, use second-hand machines, in which case the actual equipment costs will be lower - maintenance and repairs remaining the same - than those on which our analysis is based. It would be of interest to gauge the sensitivity of present cost positions with respect to a lowering of equipment costs resulting from the use of second-hand machinery, especially since this is assumed to affect negatively the relatively favourable cost position of the VSS producers found by us. To establish that impact we have recalculated our cost estimates on the basis of values assumed to reflect second-hand purchases, and have used this opportunity to incorporate in the calculations the impact of some more alternative assumptions, all with a view to assessing the sensitivity of the present cost positions, in particular that of VSS producers vis-à-vis the others. The idea was to introduce certain assumptions which, on a priori grounds, were believed to lead to a moderation or disappearance of the relatively favourable cost position of VSS firms. The following may be said about the changes introduced and the reasoning behind them.

In the first place, we decreased the value of machinery by 50 per cent, assuming that all firms had bought their machines second-hand, the 50 per cent value being thought a fair reflection of such a hypothetical situation. We further assumed lifetimes to remain unchanged, as well as maintenance and repairs.[21]

Secondly, we decreased the working capital cost of SS, MS and LS firms by 50 per cent, to reflect a hypothetical increase in attempts made by these producers to reduce their costs, while perhaps taking a little more risk.

Thirdly, we have doubled the subcontracting costs paid by VSS producers; this represents an arbitrarily assumed drastic increase in the cost of this external service.

The cost compositions resulting from the incorporation of these three changes are shown in Table VII, presented in rows VSS, SS, MS and LS. The cost differentials that follow from these are given in rows /SS-VSS/, /MS-VSS/ and /LS-VSS/ respectively.

To some extent, the results speak for themselves. They show, not surprisingly, some increase in total costs of VSS firms, although not as much as one perhaps would have expected. The reductions in total costs of the other firms also do not come as a surprise, but even in their case they cannot be called dramatic.

Looking at the differentials, we see that in spite of the various changes in costs, VSS firms maintain their advantage over SS firms.

Also regarding MS producers, the VSS firms still have an advantage, amounting to 33.5 per cent of the original advantage for the 100 per cent output level, and to 41.0 per cent for the 50 per cent output level, when all four assumptions are applied.

Table VII also shows that the cost disadvantage of VSS firms re LS firms has increased considerably, as a consequence of which the competitiveness of the former re the latter has declined further.

On the basis of this analysis we may thus conclude that the simultaneous introduction of various alternative assumptions leaves the original cost advantage of VSS producers vis-à-vis other types of smaller(er)-scale producers largely intact. In other words, the relatively favourable position of VSS firms observed by us seems to be a fairly stable one.[22]

CONCLUSIONS

This paper has largely been concerned with a cost analysis of footwear production for different types of producers, distinguished from each other according to scale of production and organisation of the production process. Use has been made of Ghanaian data, and the analysis was conducted in terms of a particular type of footwear, i.e. men's sandals, selected by us as the product of reference for comparative purposes.

The findings of the analysis - which was carried out under certain alternative assumptions - suggest that some methods of small-scale footwear production are relatively efficient and profitable. Our findings also suggest that factors related to the organisation of the production process, more specifically to the subcontracting phenomenon, may be considered important determinants of the relative cost advantage of these labour-intensive, informal modes of production. Although we consider our findings as only indicative in view of the limitations inherent in such an analysis, they are nevertheless of interest, since to some extent they show an economic

perspective for certain forms of small-scale activities. In this connection, the group of VSS footwear producers referred to in our analysis is by no means small, but probably represents the vast majority of footwear producers in Ghana. In view of this, the perspectives which we have identified for certain methods of small-scale production may be given some further attention, e.g. by determining optimal subcontracting patterns, by proposing organisational structures which would best fit the optimal subcontracting patterns, and by proposing measures which would encourage producers to participate in such organisational structures. Furthermore, it would be useful to establish whether, in branches of activity other than footwear production, methods of small-scale production also exist which, by virtue of the organisation of the production process, enjoy certain cost advantages. Such forms of small-scale production should be stimulated or promoted, and given appropriate protection wherever possible.

Another important question concerns the longer-term economic perspectives of VSS producers. This relates, among other things, to long-term developments in the factors which underly the cost position of the different types of firms. In this regard it will be of special interest to know what will happen to the cost position of LS firms in comparison with that of VSS firms, since in the present position the former already have some cost advantage over VSS firms, constituting as such a potential threat to the latter. Such a threat may become larger if LS cost advantages increase, for whatever reason. In this connection it would be particularly interesting to have an idea of the development of wage rate differences since, according to our analysis, these play a significant role in explaining cost differences, and could easily be considered as subject to longer-term

TABLE VII

Cost Composition and Cost Differentials under a Set of Alternative Assumptions[1]

(A) 100%[2]	Direct Production Costs	Overhead Costs	Working Capital Costs	Raw Material Costs	Total Costs	Original Total Costs+
			/absolute figures/			
VSS	0.697	0.083	0.032	3.750	4.562	4.472
SS	1.308	0.436	0.072	3.750	5.566	5.732
MS	1.627	0.442	0.076	3.000	5.145	5.319
LS	0.637	0.279	0.081	3.000	3.997	4.111
			/selected differentials/			
Differentials:						
/SS-VSS/	0.611	0.353	0.040	-	1.004	1.260
/MS-VSS/	0.930	0.359	0.044	-0.750	0.705	0.847
/LS-VSS/	-0.060	0.196	0.049	-0.750	-0.605	-0.361

+See tables IV and V.

1. Figures in Cedis.
2. Maximum Output.

TABLE VII (contd.)

Cost Composition and Cost Differentials under a Set of Alternative Assumptions[1]

(B) 50%[2]	Direct Production Costs	Overhead Costs	Working Capital Costs	Raw Material Costs	Total Costs	Original Total Costs+
			/absolute figures/			
VSS	0.947	0.164	0.032	3.750	4.893	4.804
SS	1.530	0.792	0.079	3.750	6.151	6.415
MS	2.031	0.856	0.089	3.000	5.976	6.263
LS	0.800	0.529	0.085	3.000	4.414	4.565
			/selected differentials/			
Differentials:						
/SS-VSS/	0.583	0.628	0.047	-	1.258	1.611
/MS-VSS/	0.1084	0.692	0.057	-0.750	1.083	1.459
/LS-VSS/	-0.147	0.365	0.053	-0.750	-0.479	-0.239

+See tables IV and V.
1. Figures in Cedis.
2. 50 percent of maximum output.

changes. The various ways in which the groups of footwear producers organise their production process - another important determinant of cost differences, as suggested by our analysis - are also likely to undergo gradual developments. However, our analysis does not provide insight into the longer-term dynamic processes which may affect the cost positions of the various types of firms. Further research is needed in this respect.

With regard to the shorter-term policy implications of our findings, we wish to make one final point. Footwear production is primarily a material-intensive activity. In the light of this, it will be clear that a major condition for adequate, regular production is the availability of raw materials at reasonable prices. Small-scale footwear producers depend for their supply of raw materials almost entirely on traders who, because of their relatively strong economic position, can easily manipulate raw material prices.[23] This situation clearly contributes to the economic vulnerability of producers. As such, any policy measure which directly or indirectly favours improved access to raw materials, while attempting to control their price, seems significant for the viability of the relatively efficient VSS producers.

NOTES

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1. This subcontracting phenomenon in footwear production has also been reported to exist in other countries. McBain (1977) refers to certain variants of it as observed in Ethiopia and the UK. Boon (1980) mentions the existence of subcontracting practices among smaller-scale producers in Spain and Mexico.

2. The firms included in our sample for various size classes were selected more or less at random from lists containing information on footwear firms provided by the Ministry of Industries in Accra, in addition to our own information obtained during earlier reconnoitering surveys, related particularly to small-scale informal footwear enterprises and their locations. Although the sample, partly in view of its size, may not constitute an entirely exact representation of the Ghanaian footwear industry as a whole, it nevertheless gives a reasonable impression of the various methods and techniques applied to various output scales in footwear production in Ghana.

3. For more detailed descriptions of alternative techniques for each stage, see McBain (1977), Boon (1980), or Lim in Bhalla (1981).

4. Some of the data presented in these tables are revisions of data already presented elsewhere (Van Heemst 1977, 1979), namely, the data related to SS, MS and LS firms in columns (4), (7) and (8) of Table I. It may be pointed out, however, that the relative positions of these firms to each other with respect to labour intensity (column 7), and profitability (column 8) is not affected.

5. We arrived at our estimates for the maximum annual output by asking producers about the time required - given existing machinery and with optimum labour force, assuming no raw material constraints and no final demand constraints - to produce certain numbers of pairs of sandals, after which we standardised the information in view of differences in working hours between firms, and converted the standardised information into annual figures.

6. By adopting this procedure, certain features of this industry can be better revealed; on the other hand, we have to acknowledge that, as a consequence, the findings and conclusions are subject to qualification in view of the fact that some producers make more than one type of footwear.

7. Aryee (1980), also referring to subcontracting practices in Ghana, remarks that, because almost all footwear firms have mechanised at least a few stages of the production process whether internally or through subcontracting, footwear produced in the small-scale sectors may not differ much in quality from that produced in the larger-scale sectors.

8. Valuation of the stages has been done as follows:
0.0, if the process takes place manually, with tools only;
0.5, if machines are used which are operated by manual or pedal power;
1.0, if electric machines are used.
The following situation will then be obtained for the 28 firms.

Stage \ Firm	1-4, 6-10, & 12	5 & 11	13	14	15	16	17	18	19	20	21	22	23	24-27
Cutting	0	0	0	0	0	0	1	0	1	0	1	1	1	1
Sewing	1+	0.5	1	1	1	1	1	1	1	1	1	1	1	1
Lasting	0	0	0.5	0.5	0	0.5	1	0.5	1	0	0.5	1	1	1
Bottoming	0	0	0	0	0	0	0	0	0	1	0	0	1	1
Finishing	1+	1+	1	1	1	1	1	1	1	1	1	1	1	1
Index	2	1.5	2.5	2.5	2	2.5	4	2.5	4	3	3.5	4	5	5

+Subcontracted.

It should furthermore be noted that, in order to reflect accurately the precise situation for each firm, account should be taken of those situations in which a certain production stage is only partly mechanised (in the sense that machine capacity for that stage would not be sufficient to sustain the maximum output level), as a consequence of which part of the output of that stage would be produced by manual operations. In view of this, the index should be considered as a rough indication of the degree of mechanisation.

9. This was done in the conventional manner by dividing the Net Present Value of expenditures on machines and tools by a factor

$$\frac{\left[1 - \frac{1}{(1 + r)^n}\right]}{r}$$

where r = discount rate and n = number of years.

10. For further discussion of various aspects of apprentice labour in the Ghanaian small-scale activities, see e.g. Aryee 1977 and 1980. Steel (1977), in his discussion of types of firms in relation to types of labour, deals with a similar topic.

11. Cf. Lim, in Bhalla (1981), who reports on the relationship between the degree of mechanisation and scale of output in the Malaysian footwear industry; or Boon (1980), referring to Mexican footwear producers.

12. Applying a test for small sample sizes with unequal variances (cf. Yamane 1964: 490-492), we obtain for the maximum output case for the difference between VSS and SS means, a t-value equal to t = 6.105, while the degree of freedom is equal to d.f. = 10. Since T 0.01; 10 = 2.764, we reject the hypothesis that the VSS and SS means are equal. For the 50 per cent of maximum output case we obtain t = 3.431 and d.f. = 9. This leads to the same conclusion as for the previous case, since T 0.01; 9 = 2.821.

13. They include for the VSS and SS firms an amount equal to 80 per cent of the computed salary of the producers, since we estimate that their participation in directly-productive activities constitutes roughly four-fifths of their total working time. In the calculations underlying the labour cost estimates, the earlier mentioned differential wage rates as they apply to large-scale, formal sector firms and small-scale, informal sector firms, have been used.

14. When going from the 100 per cent output level to the 50 per cent, the capital cost associated with productive equipment remains unchanged, while the current costs (maintenance, repairs, electricity) are assumed to decline more or less proportionally.

15. Only LS firms own the factories, including the land. It has been pointed out earlier that VSS producers pay a minimal sum for rent of the stall in which they operate (on average ¢8.-- per month in 1975).

16. The values of the various elements constituting the overhead cost total have largely been assumed to remain unchanged when output level declines to 50 per cent; only items like petrol costs were assumed to go down proportionally. As a consequence, the overhead cost per unit of output almost doubled.

17. VSS producers were found to have working capital invested only in some small stock of raw materials. They do not keep much cash for productive purposes, while the amount of their outstanding credits also did not seem to be of importance, probably because their customers (market women, private individuals)

normally pay immediately. The other types of firms appeared to keep some cash, to keep stocks (of different sizes) of finished products, and to have debts and credits outstanding with suppliers of raw material and with customers, in addition to keeping stocks of raw materials.

For the purpose of our calculations we needed a somewhat standardised working capital pattern for the various types of firms, reflecting the practices observed by us. We have adopted for the various working capital components the following pattern for, respectively, the SS firms, MS firms and LS firms; re raw material stock: 2 months, 2.5 months and 3 months production; re work in progress (valued at raw material costs): 0.25 months, 0.38 months and 0.5 months of production; re finished product (valued at costs of production): 1.5 months, 1.75 months and 2 months of output; re cash monies: 0.5 months, 1 month and 1 month of wages and salaries. For the VSS firms we adopted a working capital equal to the value of raw materials of one month of production only.

18. The labour-intensity of MS firms, as measured by manhours per unit of output in column (5) of Table III, is lower than that of SS firms for both output levels. Since MS firms have higher labour costs, this implies that the higher wages paid by MS firms overcompensate the lower labour-intensity they have in comparison with SS firms.

19. The increase in productive equipment costs when the output level drops from 100 to 50 per cent, reflects the situation referred to in note 11.

20. This insight can also be obtained indirectly by comparing the information on SS-VSS differentials on the one hand, to that on LSS-VSS firms differentials on the other.

21. These assumptions are not unrealistic, if the second-hand equipment was not too old when it was bought for the second time. Since most footwear machinery, technically speaking, is not very complex or sensitive, the technical performance of rather 'new' second-hand machinery is likely not to differ from that of new machinery. Cf. Cooper et al (1975); also McBain (1977:esp. Ch. 8).

22. Even if, in an attempt to incorporate in our analysis the turbulent price developments experienced by the Ghanaian economy during recent years, we had introduced drastic price changes in our calculations, this would not have resulted in a decline of cost advantages of VSS firms over SS firms, as long as we assume the prices of inputs to be the same for both types. This is so because the disadvantages of SS firms in most cost categories shown in our analysis will become larger as input prices rise. Another point is that if, as a result of whatever developments, the difference in raw material prices for small-scale and for large-scale firms increases, the cost disadvantage of VSS and SS firms vis-à-vis LS firms will increase correspondingly.

23. Aryee (1977: 66) mentions as an important reason why the small-scale producer has no direct links with the raw material producers, the fact that the former are not able to meet the minimum purchase quantity requirement of the latter. Of course, this is a reflection of the working capital constraints of the small-scale producers.

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TABLE A.1

Cost Composition per Unit Output; Maximum Output[1]

Firm	Group	Net Benefits per Unit Output	Total Unit Costs	Direct Labour Costs	Capital Cost & Running Cost of Productive Equipment	Sub-contracting Costs	Over-head Costs	Working Capital Costs	Raw Material Costs
1	VSS	2.614	4.636	0.624	0.001	0.104	0.125	0.032	3.750
2	"	2.798	4.452	0.461	0.006	0.104	0.099	"	"
3	"	2.675	4.575	0.591	0.002	0.104	0.096	"	"
4	"	2.859	4.391	0.274	0.005	0.204	0.089	"	"
5	"	2.636	4.614	0.704	0.013	0.026	0.089	"	"
6	"	2.207	5.043	1.072	0.005	0.104	0.080	"	"
7	"	2.941	4.309	0.341	0.002	0.104	0.080	"	"
8	"	2.850	4.400	0.436	0.003	0.104	0.075	"	"
9	"	3.018	4.232	0.274	0.001	0.104	0.071	"	"
10	"	2.828	4.422	0.467	0.002	0.104	0.067	"	"
11	"	2.960	4.290	0.411	0.010	0.026	0.061	"	"
12	"	2.955	4.295	0.349	0.003	0.104	0.057	"	"
13	SS	0.380	6.870	1.441	0.790	-	0.723	0.166	3.750
14	"	0.719	6.531	1.046	0.866	-	0.710	0.159	"
15	"	1.329	5.921	1.102	0.402	-	0.515	0.152	"
16	"	1.710	5.540	0.979	0.249	-	0.416	0.146	"
17	"	1.703	5.547	0.706	0.577	-	0.359	0.155	"
18	"	1.758	5.492	0.630	0.637	-	0.331	0.144	"
19	"	1.584	5.666	1.108	0.341	-	0.316	0.151	"
20	"	2.377	4.873	0.299	0.412	-	0.277	0.135	"
21	"	2.099	5.151	0.618	0.375	-	0.269	0.139	"
22	MS	1.330	5.920	1.786	0.511	-	0.448	0.175	3.000
23	"	2.532	4.718	0.638	0.517	-	0.435	0.128	"
24	LS	2.703	4.574	0.849	0.209	-	0.317	0.172	3.000
25	"	3.196	4.054	0.430	0.147	-	0.318	0.160	"
26	"	3.221	4.029	0.385	0.136	-	0.348	0.160	"
27	"	3.436	3.814	0.327	0.196	-	0.136	0.155	"

(1) All figures in Cedis

TABLE A.2

Cost Composition Per Unit of Output; 50 percent of Maximum Output[1]

Firm	Group	Net Benefits per Unit Output	Total Unit Costs	Direct Labour Costs	Capital Cost & Running Cost of Productive Equipment	Sub-contracting Costs	Over-head Costs	Working Capital Costs	Raw Material Costs
1	VSS	2.056	5.194	1.056	0.002	0.104	0.250	0.032	3.750
2	"	2.309	4.941	0.845	0.012	0.104	0.198	"	"
3	"	2.282	4.968	0.886	0.004	0.104	0.192	"	"
4	"	2.422	4.828	0.754	0.010	0.104	0.178	"	"
5	"	2.415	4.835	0.823	0.026	0.026	0.178	"	"
6	"	2.046	5.204	1.148	0.010	0.104	0.160	"	"
7	"	2.581	4.669	0.619	0.004	0.104	0.160	"	"
8	"	2.510	4.740	0.698	0.006	0.104	0.150	"	"
9	"	2.671	4.579	0.549	0.002	0.104	0.142	"	"
10	"	2.551	4.699	0.675	0.004	0.104	0.134	"	"
11	"	2.785	4.465	0.515	0.020	0.026	0.122	"	"
12	"	2.720	4.530	0.524	0.006	0.104	0.114	"	"
13	SS	-0.834	8.084	1.714	1.073	-	1.366	0.181	3.750
14	"	-0.618	7.868	1.423	1.178	-	1.340	0.177	"
15	"	0.699	6.551	1.158	0.534	-	0.950	0.159	"
16	"	1.243	6.007	1.033	0.320	-	0.752	0.152	"
17	"	1.044	6.206	0.871	0.795	-	0.637	0.153	"
18	"	1.219	6.031	0.671	0.878	-	0.582	0.150	"
19	"	1.110	6.140	1.215	0.465	-	0.555	0.155	"
20	"	1.917	5.333	0.398	0.569	-	0.476	0.140	"
21	"	1.745	5.505	0.641	0.507	-	0.461	0.146	"
22	MS	0.442	6.808	2.048	0.701	-	0.869	0.190	3.000
23	"	1.532	5.718	0.992	0.718	-	0.843	0.165	"
24	LS	2.038	5.212	1.103	0.290	-	0.634	0.185	3.000
25	"	2.765	4.485	0.480	0.203	-	0.635	0.167	"
26	"	2.851	4.399	0.434	0.188	-	0.611	0.166	"
27	"	3.086	4.164	0.493	0.273	-	0.236	0.162	"

(1) All figures in Cedis.