DOES ACCESS TO ELECTRICITY ENABLE THE UPTAKE OF SMALL AND MEDIUM ENTERPRISES IN SOUTH AFRICA?

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ABSTRACT
South Africa increased its electrification coverage from 36% to over 70% in the last 12 years. Predominantly poor areas, to which service provision was neglected in the past, got access to electricity. The socio-political benefits of the national electrification programme are documented, but the economic benefits which are generally assumed have not yet been analysed in detail. This paper explores how far existing surveys provide data on the impact of electrification on the uptake of small and medium enterprises or self-employment among households. We analyse nationwide household survey data from 1995 to 2004. Variation in electrification rates among households seems correlated with SMME uptake, but the nature of the association varies across regions and appears to display differing trends over time. A trend of positive correlation of SMMEs and electricity access in poor rural areas does seem apparent.

1. INTRODUCTION

The South African electrification programme (1995 – 2012) increased household electrification rates from 36% in 1995 to over 70% in 2001. It was initially thought that the provision of electricity would lead to increased use, productivity, income and economic growth. But consumer demand and uptake of businesses opportunities and income-generating activities have been disappointingly low immediately after gaining access to electricity [1]. As a development strategy, providing only energy without including opportunities for business development and poverty reduction may be unsustainable in the long run, as valuable resources will be wasted [2].

At present we have no estimates as to how far electrification in South Africa has contributed to development goals, other than electrification itself, and socio-political objectives. Starting with the premise that the purpose of development is to create healthy, educated and socially equal people, a broader approach to productive uses of energy is recommended [2]. Asking questions on income-generation or productive uses may not reveal the entire economic impact of electrification. Any energy use that contributes towards education, health and socially equal people should be considered a productive use of energy, because a healthy and educated person should increase productivity and income.

There is no systematic information on the impact of electrification on other sectors such as health, education, gender, information and communication. In the following we explore in how far access to electricity has led to the uptake of small, medium and micro-enterprises (SMMEs).

In the next section we describe the data sources used and give a brief account of applied definitions. Section 3 provides an overview of South African electrification rates and changes in these over time, as captured by various nationwide household surveys. In Section 4 we look for discernable trends in SMME uptake in different population categories, before we turn to the association between electricity access and SMME uptake in Section 5. In Section 6 we take a closer look at the increase in SMME uptake which has paralleled increased electrification rates in deep rural areas. We draw conclusions in the final Section 7.

2. DATA AND DEFINITIONS

Below we undertake exploratory analyses of raw data from the following national surveys undertaken by Statistics South Africa: October Household Surveys 1995-2000, Income and Expenditure Survey/September Labour Force Survey 2000, General Household Surveys 2002-2004, and ten percent samples from the 1996 and 2001 Population Censuses 1996 and 2001 [4,5,6,7,8].

In the household surveys sampling was conducted according to a two-stage procedure, with the sample stratified by population group, province and urban or non-urban area. In the first stage "enumerator areas" were selected as Primary Sampling Units (PSUs). In the second, 10 households were selected within each selected PSU. Once the information had been collected, individual elements in the surveys were attached with a weight, so as to make it representative of a specified number of elements in the population with similar characteristics.

The ten-percent census samples analysed here are made up of households drawn as a systematic sample from the census household files, which had been stratified according to various types of local authority boundaries. To ensure confidentiality within the 10 percent sample, a local authority had to have a minimum of 2000 households. As many local authorities, presumably in mostly rural areas, had fewer than this number, they had to be grouped together to ensure that the minimum number of households was met. The weight used in the census samples is the adjustment factor for census

undercount multiplied by ten to inflate the ten percent samples to the relevant population. Hence, these samples are likely to yield very different pictures than the household surveys. In addition, both censuses were subject to shortcomings information (as described by SSA in post-enumeration reports).

Sample surveys always involve some probable difference between a sample estimate and the corresponding total population figure. The magnitude of this difference is affected by, inter alia, the sample size and the variability between households of the characteristic being estimated. The greater the sample size and the lesser the latter variability, the better become the estimates. All surveys used here collected information on a variety of subjects including education, health, employment, and access to services and facilities. Hence, the data provide interesting information for the exploration of impacts from various government programmes. However, extreme caution must be applied in interpreting trends for the relatively small subsamples we analyse. Estimate trends are presumably less uncertain when drawn across the 1998-2000 and 2002-2003 data sets.

The analyses below are built on a set of concepts, which we define here.

Only the General Household Surveys 2002-2004 ask specifically whether the household has a connection to the grid. Therefore, a household is here considered "connected" to the grid, if it uses grid electricity as its primary energy source for light.[1]

Through the combination of the household head's population group and the household's residential area, we define nine "population categories". Population categories such as black, coloured and white are necessary so as to target programmes to correct the imbalances of the past. We recognize "rural" and "urban" categories for all population groups except the Asian (due to the minuscule number of rural households belonging to that population group). We subdivide the rural and urban African categories respectively into "deep rural" or "other" and "shacks" or "other". The "deep rural areas" encompass magesterial districts that would formerly have fallen within the boundaries of the apartheid era "self-governing territories" or "independent states". The types of dwellings recorded as "informal dwelling/shack in backyard" or "informal dwelling/shack not in backyard, e.g. an informal/squatter settlement" are here considered shacks.

An "SMME" is defined as a household in which at least one person is recorded as "self-employed" in the various data sets. Unfortunately the definitions of self-employment appear to differ slightly across surveys, especially with respect to economic sectors, activities and the required amount of time spent on activities, for inclusion in the self-employed category. Further, the definitions do not lend themselves to a uniform reconstruction applicable to all data sets. Typically however, the household respondent(s) would have assented to a question like "Does [household member] do any kind of business, big or small, for himself/herself or with one or more partners?" for at least (and in the vast majority of cases, only) one household member. In some cases members of households may have taken up a business out of necessity, in others out of opportunity. This distinction is not made in the questionnaire. The number of employees would obviously matter for the definition of this type of enterprise. Unfortunately, the 2002-2004 surveys do not enquire into numbers of employees. However, among the African population groups upon which we will come to focus, six percent or less of enterprises run by self-employed pay more than three employees (excluding the owner), across comparable surveys.[2] Finally, we have excluded domestic workers from the definition of self-employed.

3. ELECTRIFICATION RATES OVER TIME AND ACROSS POPULATION CATEGORIES

Table 1 (all tables at the end of the paper) shows the fractions of households that use grid electricity as their main source for lighting, by population categories. As can be seen, the connection rates and the change in these appear to vary considerably across population groups and residential categories within these. The table also shows how data from different surveys yield very differing results. Given this variation in results, we refrain in this analysis, as far as possible, from attempting to rigorously determine absolute levels of electrification or SMME uptake. Rather, we intend to explore discernable trends and we recommend caution in the interpretation of figures.

The data do indicate some trends in the levels and change of levels of electrification rates. It appears as if the electrification programme has been well targeted at previously disadvantaged groups, mostly at the African population group. Taking the data at face value, connection rates in the deep rural areas have quadrupled - from 15% in 1995 to 61% in 2004. Except for the rural coloured households, the other population categories already had high connection rates in 1995 ranging from 91% for urban coloureds to 100% for urban whites (Table 1). Overall, urban households have higher connection rates than rural households except for African urban shack dwellers whose connection rates appear consistently low and range from 31% to 57 %.

4. UPTAKE OF SMMES OVER TIME AND ACROSS POPULATION CATEGORIES

Table 2 shows the development of the allover SMME uptake among all households (connected and non-

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[1] Data from detailed energy surveys reveal that when households first get connected to electricity, they use electricity primarily for lighting even if they cannot afford it for anything else.

[2] We have compared figures for OHSs 1995 and 1997-1999.

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connected) over time. Again, the fraction of households with SMMEs varies across population categories, and different surveys provide different results. Quite clearly, SMME uptake (or self-employment) appears to be more frequent in the Asian and in two white categories than among African and coloured households.

The ten percent sample from the 1996 census yields very low SMME figures for all population groups. The same is true for the figures pertaining to the African and coloured population in the second (2001) census sample. In the latter, SMMEs have tripled among the rural white population and doubled among the urban white. Hence, it appears that different definitions apply. It is noteworthy that according to the same two sources, SMME uptake in the African and coloured categories has hardly changed between 1996 and 2001. However, if one disregards the census figures, the trend seems to be that SMME uptake is higher in 2004 than in 1995 in the African deep rural areas, but less so in the other African categories.

5. SMMES – DOES CONNECTION MATTER?
We now turn to the association between electricity access and SMME uptake. Tables 3a to 3c show the distribution of connected and unconnected households that run SMMEs and the time lapsed since connection, which was investigated only in the 2002-2004 surveys. The figures in the tables are cell percentages, which by addition all sum to one hundred. The last column contains the row category's fraction of the total sample (including connected and non-connected households).

Quite a few trends appear consistent across these three surveys. Firstly, three quarters of all households with SMMEs are connected, of which a little less than one third are white. A good two thirds of SMMEs are found in households which have been connected for *more* than five years, and 20% or so are found among urban African non-shack households with a long connection. Secondly, in total, 15-20% of SMMEs are *not* connected to the grid. Thirdly, roughly one tenth of all SMMEs are found in households connected to the grid for *less* than five years – the overwhelming majority of which are African.

Out of the total, African households in the urban non-shack category and deep rural areas hold roughly one-quarter of the households with SMMEs. However, only five percent are households in the deep rural areas that have been connected for *less* than five years. Finally, as compared to their shares of the total sample, non-connected households and all African categories, except households in the deep rural areas, appear under-represented among SMMEs.

Since electrification has been increasing rapidly among African households and half the SMMEs are hosted by that population group, we now take a closer look at the relationship between grid connections and SMME uptake among African households.

The upper section of Table 4 shows the SMME uptake in connected households in the African categories, while the middle section shows the same for non-connected households. The lowest section shows the difference in SMME uptake as a percentage fraction of the uptake among non-connected households. (Hence, according to the 1995 survey, in the deep rural areas uptake was 79% higher among connected than among non-connected households.)

The figures in the bottom row of the table's lower section suggest that for all years the total SMME uptake among African households was higher among connected households. However, underneath that trend lie what appear to be considerable differences for the various subcategories. For the deep rural category, the uptake is consistently higher in connected households and, if disregarding the extreme figures, in the vicinity of 20-40% higher. For the "other" rural category the uptake is often higher and very much so in connected households. However, there is considerable variation in the magnitudes and the difference is sometimes negative. Among urban shacks it is more doubtful whether connected status is associated with a higher uptake of SMMEs. In the other urban category the influence of connections on SMMEs uptake seems mostly positive, although not consistently so, and the magnitudes of differences are not as high as in the deep rural areas.

It appears that, in the African population, having a grid connection is an advantage in running an SMME and most detectably so in the deep rural areas. The next section therefore investigates closer into the development of electrification and SMME uptake in those areas.

6. SMME UPTAKE OVER TIME AMONG CONNECTED AND NON-CONNECTED HOUSEHOLDS IN THE DEEP RURAL AREAS
Table 5 shows the development of the electrification rate and various indicators of self-employment in the deep rural areas. In analysing these figures we again face the choice of either trusting the two sets of census samples or believing in the more interesting trend from the survey figures. The ten percent census sample figures indicate that between 1996 and 2001 the rate of electrification in the rural areas has more than doubled, while very little has happened there to SMME uptake, whether in total, among connected or among the non-connected households. In the mean time, (as pointed out in connection with Table 2) census figures indicate that, in the same period, self-employment in the rural white population has more than tripled, while that of the urban whites has doubled. We cannot discard the scenario depicted by the censuses, as it may be correct . Yet, as an alternative, we proceed to present the scenario derived from the household survey data, disregarding all census sample figures from now on.

The first row in the upper section of the table shows the estimated fraction of all South African households that reside in the deep rural areas. As can be seen, with the exception of the 1995 survey, the fraction revolves around one-quarter. The second row replicates the electrification

rates in Table 1. The third and fourth rows show the fractions that connected and non-connected SMME households constitute out of all households in the deep rural areas. (The figures add up to the fraction of total SMME uptake.) Under an assumption that the number of households in the deep rural areas have not changed dramatically, the *fractions* of all households that are either connected SMMEs or non-connected SMMEs, provide an indication as to the change in *numbers* of SMMEs.

In the fifth row, we find the allover SMME uptake in the deep rural areas from Table 2, and in the subsequent row the uptake among connected and non-connected households from Table 4. The lower section of the table shows the year-to-year percentage changes for the figures in the upper half of the table. As can be seen, for example, the year-to-year changes in electrification are, as expected, always positive.

The rightmost column in Table 4 contains the average for all figures pertaining to SMME uptake. Total SMME uptake has been higher than average for every year since 1999. The same is true for SMME uptake among the non-connected and, with the exception of 2003, also for SMME uptake among connected households. In addition to the observation made in connection with Table 4, that SMME uptake appears higher among connected households, it thus also appears as if SMME uptake is increasing the deep rural areas. It is noteworthy that in the beginning of the period, roughly one quarter of all SMMEs were run by electrified households. The data suggest that the corresponding fraction is around two thirds.

If acquiring a connection did not affect the decision of non-connected households to either uptake or close down SMMEs, we would expect the prevalence of non-connected SMMEs to diminish at roughly the same rate as the fraction of all non-connected households (if new connections are equally distributed among SMME and non-SMME households). In parallel, the fraction of connected SMME-households would increase by the number with which non-connected SMME households diminish. The figures in the second and third rows of Table 5 contradict this scenario. Firstly, by 1998 to 1999 it appears as if the number of non-connected SMME households had *increased* as compared to the initial years. Secondly, the fraction of connected SMME households has increased by a higher rate (and to a higher level) than what would be suggested by the drop in non-connected. Indeed, it has increased at a higher rate than electrification itself. Both these trends suggests that, during the period of observation, other factors than the grid roll-out have affected SMME uptake positively, at least in the years up to 1999.

Taking the data at face value, the overall uptake among connected households has increased by a good 10% since the beginning of the period. As compared to the more than 40% increase among non-connected, the former appears small. Yet, the mere increase in connected households, in combination with a higher SMME uptake among connected households than among non-connected, has resulted in a much larger prevalence of SMMEs.

Taking all figures at face value, electrification in the deep rural areas has increased by almost 300% during the period. The fraction of households which hosts connected SMMEs have increased by almost 350%. The latter fact does support the notion that there the propensity for SMME uptake among the recently connected has increased by roughly one fifth. However, equally remarkably, while the fraction of non-connected households has been more than halved, the fraction of ditto SMME households has decreased by one-third. The latter suggests that the propensity for SMME uptake among the non-connected has increased by twice as much as among the connected.

Using only the endpoint figures, two simulations depicted in Table 6 show how the observed 4.6 percentage points (i.e. 60%) increase in total SMMEs uptake from 1995 to 2004 can be disaggregated into shares mathematically attributable to electrification and change in uptake rates. (The figures in bold are observed.) If one starts out from the 1995 total uptake rate and only increase the electrification from 15.4% to 60.6%, the total SMME uptake would have increased to 10.1%. By thereafter changing the uptake rates to those prevailing in 2004, the remaining 2.2 percentage points are incorporated. By this approach, 53% of the total increase in SMME uptake is attributable to the "pure" roll-out effect and 47% to the change in uptake. In the alternative explanation, one chooses the change in uptake rates as the point of departure. The "pure" uptake effect raises the total uptake to 10.4%. The attributions then become 40% to the roll-out and 60% to the uptake change.

The two means of disaggregation above are mathematically equally valid. Thus, here we can only conclude that the contribution from the grid roll-out ranges between 40% and 53%, whereas the pure change in uptake should be attributed between 47% and 60% of the effect. While the factors underlying the change in uptake are thus far not identify. It seems plausible that some of the increased SMME activties should be attributed to the roll-out and if newly connected households do not cease their existing SMME activities, the rate of uptake among the connected should continue to increase.

7. CONCLUSIONS

We have here undertaken exploratory analyses of data from national household surveys, which span a ten year period from the year succeeding South Africa's democratization. While the trends captured by the data must be interpreted with extreme caution, we have observed several interesting phenomena pertaining to the association between electricity access and SMME uptake. According to the household survey data, this association appears especially strong among African households in the deep rural areas. However, the ten percent census sample figures indicate that between 1996 and 2001 the

rate of electrification in the deep rural areas has more than doubled, while very little has happened to SMME uptake.

Going with the household survey data, a good 20% of all enterprises run by self-employees belong to white owners and have been connected to the grid for a long time. Around one quarter of the country's SMMEs are, however, run by African households in the deep rural areas. Among those SMMEs roughly one fifth have had a grid connection for less than five years. Also, the allover picture suggests that households do not take up SMMEs immediately after connection. Households which are connected for more than five years have significantly higher proportions of SMMEs than households which are connected for less than five years.

The data we have analysed suggests that SMME uptake is in general, always higher among connected than among non-connected African households. However, this apparent general trend is mostly driven by the strong relationship in the deep rural areas. In those areas, the SMME uptake rate appears to have increased by more than 40% among *non-connected* households and only 10% among connected. Still, taking the data at face value, the fraction of households in the deep rural areas which are both connected *and* run SMMEs has increased by on average 18% per year since 1995. Electrification has increased by on average 16% per annum. This has yielded a near 300% increase in electrified households and an increase by almost 350% of SMMEs run by electrified households. In the beginning of our period of analysis, roughly one quarter of all SMMEs in deep rural areas were run by electrified households. The data suggest that the corresponding fraction at the end of the period is around two thirds.

In light of the increased SMME uptake also among non-connected households, other factors than the grid roll-out would have contributed to the boom in such activities among households in the deep rural areas. There, the vast majority of SMMEs are in the wholesale and retail sector. Explanations for the increase in activity could thus be found in a closer integration with the rest of South Africa, whereby a greater and more varied assortment of goods for sale would circulate. Furthermore, the increased spread of cellular telephone technology may be a contributing factor, as would be cash holdings originating in old age pensions or other child grant pay-outs to young mothers in those areas. On a graver note, the issue of whether these households have taken up a business out of opportunity or out of necessity has not been established. The contributions from these factors are yet to be identified. In the meantime, we estimate that somewhere between 40% and 53% of the increased SMME activities are attributable to the grid-roll out.

Table 1: Fraction of households using grid electricity as main source for lighting, by population categories

(October Household Surveys 1995-1999, Income and Expenditure Survey/September Labour Force Survey 2000, General Household Surveys 2002-2004, 10% samples of Census 1996 and 2001; weighted figures).

Population group	OHS 1995	OHS 1996	1996 Census (10%)	OHS 1997	OHS 1998	OHS 1999	OHS 2000	2001 Census (10%)	GHS 2002	GHS 2003	GHS 2004
African											
Deep rural	15.4	24.1	22.5	30.7	31.6	39.6	42.0	49.0	54.4	57.6	60.6
Other rural	35.6	34.2	28.5	38.5	44.8	53.6	58.5	51.3	63.1	67.6	71.0
Urban shacks	46.3	30.7	31.6	40.8	39.3	44.7	48.2	42.6	54.2	54.9	57.0
Urban other	86.8	86.7	81.3	86.2	87.2	86.9	89.0	87.1	91.6	93.7	94.1
Coloured											
Rural	60.2	61.8	54.2	67.5	60.7	63.1	67.1	66.1	68.2	71.8	71.1
Urban	90.7	91.0	89.6	92.7	94.3	91.7	90.2	92.8	92.9	94.1	95.2
Asian	98.1	98.9	98.7	98.5	99.4	99.6	97.3	98.7	98.7	99.7	99.7
White											
Rural	93.9	97.7	92.8	94.6	99.1	92.8	95.2	95.5	96.9	97.4	97.9
Urban	99.9	99.4	99.0	99.5	100.0	99.2	99.5	99.2	99.7	99.8	99.7
Total	*65.0*	*62.1*	*57.2*	*65.1*	*66.6*	*69.2*	*71.3*	*70.2*	*76.2*	*78.6*	*80.1*
Sample size	29700	15917	841 036	29811	18951	26098	25937	948 592	26194	26349	26190
Note: Electricity connections are assumed to be equal to the number of households using electricity for lighting.											

Table 2: Fraction of households with at least one person in self-employment among all (i.e. connected and non-connected households – definition of connection from Table 1 applies), by population categories
(October Household Surveys 1995-1999, Income and Expenditure Survey/September Labour Force Survey 2000, General Household Surveys 2002-2004, 10% samples of Census 1996 and 2001; weighted figures)

Population group	OHS 1995	OHS 1996	1996 Census (10%)	OHS 1997	OHS 1998	OHS 1999	OHS 2000	2001 Census (10%)	GHS 2002	GHS 2003	GHS 2004
African											
Deep rural	**7.6**	**5.8**	**3.0**	**7.3**	9.3	14.1	14.7	2.7	**11.9**	**10.2**	**12,2**
Other rural	3.0	8.0	2.5	5.7	7.5	9.6	8.3	1.9	7.0	5.8	5,7
Urban shacks	11.9	8.5	4.4	8.3	11.5	12.3	18.7	3.4	15.2	12.5	13,3
Urban other	8.1	8.6	4.3	8.2	10.1	11.0	14.5	3.7	11.5	9.8	9,9
Coloured											
Rural	2.2	7.3	1.9	0.9	2.5	4.5	3.0	2.0	1.5	1.2	1,2
Urban	6.9	10.1	3.9	5.6	7.6	10.2	11.2	4.3	7.3	7.0	7,7
Asian	20.	9.1	9.8	17.8	21.3	21.0	16.6	14.4	13.8	17.9	15.4
White											
Rural	45.4	7.2	11.7	40.8	37.1	48.5	36.8	36.2	47.4	41.4	51,1
Urban	15.2	9.4	8.8	16.0	18.4	21.2	18.1	16.8	18.5	16.5	18,9
Total	**9.6**	**8.1**	**4.7**	**9.2**	11.2	13.7	14.5	**5.3**	**12.2**	**10.6**	**11.7**
Sample size	29 700	15 906	841 002	29 805	18 943	26 089	25 937	948 592	26 175	26 338	26 168

Table 3a: Distribution of households with SMMEs across connection status 2002 - *Cell percentages*

Population category		Not connected	Connected			Total (hhs with SMMEs)	All households
			> 5 years	< 5 years	Household existing < 5 years		
African	Deep rural	9.0	8.9	5.6	0.6	**24.0**	24.8
	Other rural	2.3	2.7	1.9	0.4	7.3	12.8
	Urban shacks	5.3	4.2	1.5	0.6	11.6	9.3
	Urban other	3.2	**20.1**	3.0	2.0	**28.4**	30.2
Coloured	Rural	0.1	0.1	0.1	0.0	0.2	1.5
	Urban	0.1	3.5	0.2	0.1	3.9	6.4
Asian		0,0	2.5	0.2	0.1	2.7	2.4
White	Rural	0.1	4.3	0.1	0.2	4.6	1.2
	Urban	0.3	**16.2**	0.0	0.7	**17.3**	11.4
Total (hhs with SMMEs)		**20.5**	**62.5**	**12.4**	**4.6**	100.0	(12.2)
All households		24.6	56.4	13.7	5.3		100.0
General Household Survey 2002; weighted figures (Households with SMMEs n=3072. All households n=26 175)							

Table 3b: Distribution of households with SMMEs across connection status 2003 - *Cell percentages*

Population category		Not connected	Connected			Total (hhs with SMMEs)	All households
			> 5 years	< 5 years	Household existing < 5 years		
African	Deep rural	8.3	9.3	4.7	0.6	**22.9**	23.9
	Other rural	2.3	3.4	1.1	0.3	7.1	13.1
	Urban shacks	5.3	4.0	1.4	0.2	10.9	9.3
	Urban other	2.1	**21.7**	3.0	1.8	**28.6**	31.1
Coloured	Rural	0.1	0.1	0.0	0.0	0.2	1.5
	Urban	0.1	3.9	0.1	0.2	4.3	6.4
Asian		0,1	3.9	0.0	0.3	4.3	2.5
White	Rural	0.2	3.9	0.2	0.4	4.7	1.2
	Urban	0.3	**16.1**	0.2	0.5	**17.1**	11.0
Total (hhs with SMMEs)		**18.7**	**66.3**	**10.7**	**4.3**	100.0	(10.6)
All households		22.8	59.9	12.2	5.1		100.0
General Household Survey 2003; weighted figures (Households with SMMEs n=2620. All households n=26 338)							

Table 3c: Distribution of households with SMMEs across connection status 2004 - *Cell percentages*

Population category		Not connected	Connected			Total (hhs with SMMEs)	All households
			> 5 years	< 5 years	Household existing < 5 years		
African	Deep rural	8.0	11.6	5.9	0,3	**25.9**	24.7
	Other rural	1.8	3.2	1.2	0,2	6.5	13.3
	Urban shacks	5.0	3.8	0.7	0,3	9.8	8.6
	Urban other	1.9	18.9	2.6	2,0	**25.4**	30.0
Coloured	Rural	0.0	0.1	0.0	0,0	0.2	1.5
	Urban	0.2	3.8	0.0	0,1	4.2	6.3
Asian		0,0	3.3	0.1	0.2	3,6	2.7
White	Rural	0.2	5.1	0.1	0,5	5.9	1.3
	Urban	0.2	17.8	0.2	0,7	18.8	11.6
Total (hhs with SMMEs)		**17.4**	**67.5**	**10.8**	4.4	100.0	(11.7)
All households		20.4	62.0	11.8	5.9		100.0
General Household Survey 2004; weighted figures (Households with SMMEs n=2747. All households n=26 168)							

**Table 4: Comparison of SMMEs uptake among connected and non-connected households
in the four African categories over time**

	OHS 1995	OHS 1996	1996 Census (10%)	OHS 1997	OHS 1998	OHS 1999	OHS 2000	2001 Census (10%)	GHS 2002	GHS 2003	GHS 2004
Connected											
Deep rural	12.2	6.8	3.9	8.4	10.3	15.6	17.5	3.5	13.8	11.1	13.9
Other rural	3.1	9.4	2.3	5.2	6.5	9.9	8.0	2.0	7.8	6.1	5.9
Urban shacks	12.9	7.2	4.1	6.5	9.8	12.1	18.0	3.6	15.7	12.4	11.6
Urban other	8.1	7.9	3.8	7.7	10.1	11.1	14.2	3.8	11.3	9.9	9.9
Total	11.5	7.8	3.7	7.5	9.6	12.0	14.4	3.4	11.8	9.8	10.4
Sample size	8 823	5 599	265 537	11 520	8 153	12 340	13 372	464 783	14 156	14 852	15 313

	OHS 1995	OHS 1996	1996 Census (10%)	OHS 1997	OHS 1998	OHS 1999	OHS 2000	2001 Census (10%)	GHS 2002	GHS 2003	GHS 2004
Non-connected											
Deep rural	6.8	4.8	2.3	5.8	8.6	13.1	12.3	2.0	9.6	9.0	9.8
Other rural	2.9	5.8	2.2	5.0	8.2	9.2	8.1	1.8	5.6	5.1	5.3
Urban shacks	11.0	7.2	3.8	8.6	12.4	12.4	18.4	3.2	14.4	12.6	15.8
Urban other	7.8	6.4	3.4	6.3	9.6	10.0	15.3	3.2	12.8	8.4	11.6
Total	6.2	5.6	2.7	6.2	9.2	11.9	13.2	2.4	10.0	8.9	10.2
Sample size	10 359	6 468	348 172	10 882	5 988	7 632	7 266	266 902	5 667	5 137	4 616
Percentage difference between connected and non-connected											
Deep rural	79	40	66	43	20	19	42	79	44	24	42
Other rural	8	62	5	3	-21	7	-2	15	38	19	13
Urban shacks	17	1	8	-24	-21	-2	-2	14	9	-2	-27
Urban other	4	23	13	22	5	10	-7	18	-11	17	-15
Total	85	39	36	22	4	1	9	43	18	10	2

Table: 5 Electrification and self-employment figures for deep rural areas 1995-2004, weighted figures

|	1995	1996	C96	1997	1998	1999	2000	C01	2002	2003	2004	Avg
Fraction of all households	21.7	24.0	25.8	26.1	24.3	24.5	23.2	23.1	24.8	23.9	24.7	
Electrification rate	15.4	24.1	22.5	30.7	31.6	39.6	42.0	49.0	54.4	57.6	60.6	
Connected SMMEs as fraction of all hh's	1.9	1.6	0.9	2.6	3.3	6.2	7.3	1.7	7.5	6.4	8.5	5.0*
Non-connected SMMEs as fraction of all households	5.7	3.7	1.8	4.0	5.9	7.9	7.1	1.0	4.3	3.8	3.8	5.1*
Sum = Total SMMEs uptake	7.6	5.3	2.7	6.6	9.1	14.1	14.4	2.7	11.9	10.2	12.3	10.2*
SMMEs uptake among connected	12.2	6.8	3.9	8.4	10.3	15.6	17.5	3.5	13.8	11.1	13.9	12.2*
SMMEs uptake among non-connected	*6.8*	4.8	2.3	5.8	8.6	13.1	12.3	2.0	9.6	9.0	9.8	8.9*
Year by year percentage change in:												*Total growth*
Electrification rate		57		36	3	25	6		*14**￼*	6	5	16	294
Connected SMMEs as fraction of all hh's		-14		57	27	90	18		*1**￼*	-15	32	18	350
Non-connected SMMEs as fraction of all households		-36		10	45	35	-10		*-22**￼*	-12	0	-4	-33
Total SMMEs uptake		-30		25	38	54	2		*-10**￼*	-14	20	6	62
SMMEs uptake among connected		-44		24	23	52	12		*-11**￼*	-19	25	2	15
SMMEs uptake among non-connected		-29		21	47	53	-7		*-12**￼*	-6	9	4	44
* Averages are computed disregarding census figures.												
** Average annual growth rate for 2001 and 2002 as computed from levels in 2000 and 2002												

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Table 6: Observed and simulated fractions of connected and non-connected SMMEs out of all households

	1995 uptake rates			*2004 uptake*			
	Connected (12.2%)	*Non-connected (6.8%)*	*Total*	*Connected (13.9%)*	*Non-connected (9.8%)*	*Total*	*Difference in Totals*
1995 electrification rate (15.4%)	**1.9**	**5.7**	**7.6**	2.1	8.3	10.4	*2.8*
2004 electrification rate (60.6%)	7.4	2.7	10.1	**8.5**	**3.8**	**12.3**	*2.2*
Difference in totals			*2.5*			*1.9*	

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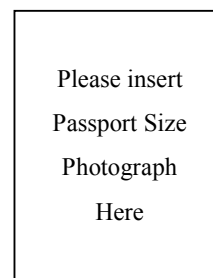
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